This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

**Usage guidelines**

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

**About Google Book Search**

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

BOSTON
MEDICAL LIBRARY
8 THE FENWAY

# RED CROSS NOTES

Copyright 1910 by Johnson & Johnson

SERIES VII NUMBER ONE

## LIGATURE NUMBER

SHEEP'S INTESTINES (RAW CATGUT), CLEANSED AND DISINFECTED PREPARATORY TO SPLITTING.

CATGUT CLEANSED, SCRAPED AND SPLIT PREPARATORY TO BEING TWISTED INTO STRANDS.

PLAIN RAW CATGUT.

STERILE CATGUT IN NUTRIENT BOUILLON.

INFECTED CATGUT IN NUTRIENT BOUILLON.

**BACTERIOLOGICAL TEST No. 1102**

Samples from this lot of ligatures have been tested in our Bacteriological Laboratories and found sterile.

Johnson & Johnson
NEW BRUNSWICK, N.J. U.S.A.

TEST CERTIFICATE ATTACHED TO LIGATURES.

CATGUT TESTS. In our bacteriological laboratories the batches of catgut are tested by placing strands in nutrient bouillon, and incubating. If the bouillon remains clear the catgut is sterile; infected catgut shows cloudiness and growth. The two tubes on this page illustrate the process. The tube on the right shows the result in infected catgut. To each container the test certificate shown upon this page is attached. Full description of these tests will be found in the pages which follow.

EXACT SIZE

**RED CROSS**
**ASEPTIC CATGUT LIGATURES.**
IN DOUBLE ENVELOPE GERM PROOF.
*No 1. Length 28 inches.*

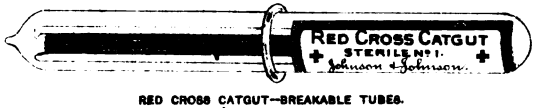
These Ligatures after wrapping in inner envelope have been made absolutely aseptic by successive sterilizations.
TO REMOVE THE LIGATURE.—(1) Remove the outer envelope. (2) Tear off end of first paper then extract inner paper, inserting only the ends. (3) Under aseptic conditions cut off further end of inner paper and draw out ligature.
JOHNSON'S ASEPTIC LABORATORIES. NEW BRUNSWICK, N.J. U.S.A.

**RED CROSS**
**ASEPTIC SILK LIGATURES.**
IN DOUBLE ENVELOPE GERM PROOF.
*No. 12. Length 1 yard*

These Ligatures after wrapping in inner envelope have been made absolutely aseptic by successive sterilizations.
TO REMOVE THE LIGATURE.—(1) Remove the outer envelope. (2) Tear off end of first paper then extract inner paper, inserting only the ends. (3) Under aseptic conditions cut off further end of inner paper and draw out ligature.
JOHNSON'S ASEPTIC LABORATORIES. NEW BRUNSWICK, N.J. U.S.A.

**RED CROSS**
**STERILIZED TAPE**
FOR TYING UMBILICAL CORD
This tape has been made absolutely aseptic by successive sterilizations.
CAUTION.—To prevent infection, disinfected hands or forceps should be used to open the inner envelope.
JOHNSON'S ASEPTIC LABORATORIES, NEW BRUNSWICK, N. J., U. S. A.

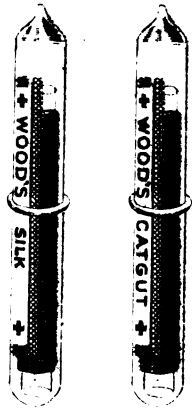
EMERGENCY TUBE WITH NEEDLE




RED CROSS CATGUT—BREAKABLE TUBES.

EACH BREAKABLE TUBE IS ENCLOSED IN A PASTEBOARD BOX TO PREVENT BREAKAGE

METHOD OF OPENING "BREAKABLE" TUBES.




WOOD'S SILK. WOOD'S CATGUT.

# RED CROSS NOTES

COPYRIGHT 1910 BY JOHNSON & JOHNSON

SERIES VII. NEW BRUNSWICK, N. J. NUMBER ONE

RED CROSS NOTES.

Published by Johnson & Johnson, New Brunswick, N. J., U. S. A.

Fred B. Kilmer, Editor.

This publication is issued from the laboratories of the publishers with the intent to give, in brief, items of interest and reports of original research along the line of the particular branches of the art in which they labor.

The price of these issues is $1.00 per year.

Persons receiving Red Cross Notes will confer a favor by notifying the publishers of any inaccuracy in the address on the wrapper, and of any change of their address.

Original communications and suggestions along the lines covered by this publication are always welcome.

JOHNSON & JOHNSON,
New Brunswick, N. J., U. S. A.

## CATGUT PROBLEMS.

Catgut problems come and go in the daily tasks set before the workers in the Johnson & Johnson laboratories. The staff is without doubt well fitted for the study of catgut. The director (Mr. Kilmer) has since the re-introduction of catgut into surgery some twenty-five years ago, made a special study of the physical and chemical properties of this substance, and has given much time to the working out of the physiological processes involved in its absorption. His associate (Mr. Clark) has had the benefit of a long experience in the laboratories of the J. Ellwood Lee Company, where he has worked upon problems of sterilization, bacteriological tests and preservation. The laboratories are in direct association with several well equipped biological laboratories, and in addition have been aided by a corps of competent operators, who have extended the work into the operating room and clinic.

The rank and file of the operatives in these laboratories are those who, by long training, have learned one thing —catgut—and have learned it well. Altogether these workers supply sufficient catgut for more than two million operations every year.

During the period falling within the range of these observers, an extended research has been made into the voluminous literature of catgut, investigations have been made as to the method of preparation of the raw gut in the abattoirs in foreign countries, from which supplies are principally derived. Every known and every suggested method has been worked out, and it is within the limit to say that from two hundred to two hundred and fifty separate processes have been practically demonstrated in the laboratory. It is worthy of note, that notwithstanding the fact that no one topic has received more attention than that of the disinfection and preparation of catgut, none of the infinite number of processes has been wholly satisfactory. Processes which produced sterile ligatures tended to make them brittle; methods that did not make the strands tender left them infected. Finally, if by chance they were made sterile they were easily reinfected, so that no one operator or no one manufacturer was really furnishing absolutely aseptic ligatures.

The difficulties to be overcome have been hardly realized, partly from the fact that few have conceived the nature of the material. Catgut, or the intestine of sheep, is a gelatinous substance often infected at its original source with most resistant forms of germ life. This material is twisted into hard cords, and constitutes the ordinary raw catgut of commerce. Such a strand of material is impenetrable by most solutions, it is destroyed by heat, and is rotted by chemicals and substances used in wound disinfection. It is a jelly-like thing taking to itself moisture, and that in itself receives, holds and nourishes germ life, easy to infect, hard to disinfect.

But out of this twenty-five years' work have come methods which, so far as sterilization alone is concerned, have reached toward perfection.

In the consideration of the requirements of catgut for use as a ligature and suture material, and in the working out of methods for its sterilization, certain vital points are often ignored or overlooked. The conditions under which catgut is born in the living body without reaction and absorbed into it without a residue, are very complicated.

The perfect sterilization of catgut, while of prime importance, does not suffice to fulfill the requirements for perfect absorption. An aseptic wound heals easily over an indifferent, chemically inactive foreign body—for instance, silk—but a string of catgut imbedded in a wound tissue presents other and greater problems. It is to be absorbed slowly. As soon as it is implanted in a wound there begins a series of chemical and physiological processes which need special study. There is in this instance a transplantation of tissue of a different kind, or more nearly the blocking of a tract with a dead material—the implanting of a chemically different material into living animal tissue.

Problems in the use of heteroplastics, problems involving chemotaxis and the action of living processes upon dead organic compounds at once arise. Catgut is non-absorbable unless it is first broken down into compounds that are less complex, absorbable and assimilable. Further than this, sterile catgut is a gelatinous material, and in wound tissues is at once a nidus for germ collection and growth. This latter statement of fact is important, as is also the statement of an eminent operator to the effect that every surgical operation is a study in biology and bacteriology, and the further demonstrated truth that pathogenic bacteria are to be found in the most carefully prepared wound surface.

Herein is presented a discussion of some of the problems involved in the preparation of catgut. Others remain to be solved.

Write for a "Hand Book of Ligatures."

## READ THE COVER.

The cover of this issue of Red Cross Notes tells an interesting story quite independent of the contents. On the front page, catgut from start to finish is graphically pictured.

The upper figure shows the intestines of sheep, emptied of their contents, cleansed, disinfected, and wound upon a glass spindle, preparatory to splitting.

In the figure next below, a tube of cleansed, and disinfected intestine is shown stretched over a glass rod and split, preparatory to being twisted into strands.

The figure which follows shows the strands of split tissue twisted together and gathered into a coil. Following this is a sealed tube containing catgut wound upon a glass rod, covered with protective fluid.

At the bottom of the page the bacteriological tests are portrayed. On the left is a tube, stoppered with cotton, containing nutrient bouillon. In the bouillon appears a strand of sterile catgut. The nutrient bouillon remaining clear is the test for sterility. An infected strand is shown in a second tube. In this tube the bouillon has become cloudy and is covered with growth.

The back cover exhibits the peculiar feature of Zonas Catgut, and illustrates a most striking test. On this page is pictured a plate of nutrient agar jelly, infected with staphylococcus pyogenes aureus. Bacterial colonies can be seen growing around the strand of plain sterile catgut which has been imbedded therein. Strands of Zonas Catgut are surrounded by a clear zone, strikingly demonstrating the fact that organisms cannot grow in the presence of Zonas Catgut.

On the interior pages the various forms of catgut ligatures in Envelopes, Breakable Tubes, Emergency Tubes and Tank Packages, are shown.

Hand Book of Ligatures, a handsomely illustrated book of forty pages, describing methods of preparing ligatures their sizes, styles of packing, tests, etc. Sent on request.

Write for a sample of Red Cross Catgut.

# CATGUT ABSORPTION

(Contribution from the Scientific Department of Johnson & Johnson.)

## SYNOPSIS.

The problem of the absorption of catgut in wound tissue is but little understood.

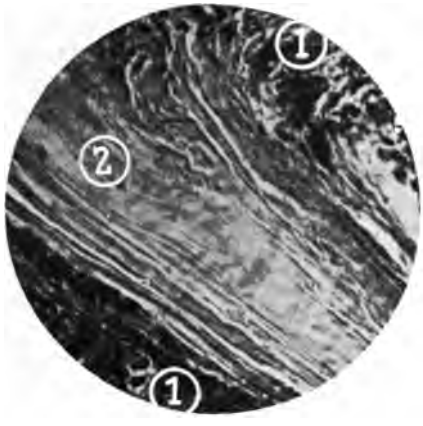
Previous research work in the laboratories of Johnson & Johnson.

Report of an extended series of experiments to demonstrate the physiological process involved in the absorption of a catgut strand.

Reproduction of microscopic sections of tissue showing strands of catgut undergoing dissolution and resorption.

The resorption of catgut with an attempt to explain the processes involved and the role of the leukocytes therein

The problem of the absorption of catgut is daily before the workers in our laboratory. In our correspondence with surgeons, embracing as it does many thousand operators in all parts of the world, we find that the problem is one which is also constantly in evidence in their work. While the literature in respect to catgut absorption is extraordinarily large, positive information as to the mode of absorption of catgut and the phenomena presented when a strand is imbedded in the tissue under normal conditions, is very meager.




Rabbit I—Section of Muscle X 400. Ligature (2) surrounded by a mass of lymphocytes (1), intermixed with numerous polymorphonuclear leukocytes. The ligature has unwound, separating into strands, the interstitial spaces more or less infiltrated with leukocytes.

Rabbit I—Section of Peritoneum X 52. Ligature (2) imbedded in a mass of leukocytes, mostly of the lymphocyte type (1), intermixed with polymorphonuclear leukocytes. Ligature has unwound and opened into strands, the interstitial spaces of which have more or less infiltraed with leukocytes. In places shows decided signs of the solvent action of the surrounding cells and body fluids.

The views of surgeons are greatly varied, and there is often a demand for extraordinary or impossible results. For example, a demand is often expressed for a form or variety of catgut of which it can be said that a certain size will, when imbedded in the tissues, be absorbed without any extraordinary reaction within a specified time. It is often demanded that a small, weak strand shall be made to withstand the strain of joining two apposing muscular tissues until the opening has united sufficiently to no longer need the aid of suture, and that then the strand of catgut shall disappear. One writer tells of an ideal strand of catgut in an ideal wound which, after serving its

purpose of holding the tissues together until firm union has taken place, "is silently and perfectly removed by the activity of the living cells in the patient's body." Another enthusiastically speaks of a suture which at the end of a given time is absorbed and disappears "as does the dew before the rising sun." Demands of this character, however, are not based upon experimental evidence. Positive experimental evidence is very meagre and for the most part unsatisfactory.

Our research department has therefore made some notable contributions to the question of catgut and its absorption, principally confined to experiments upon animals, and carried out with a view to ascertain the time required for the absorption of hardened or chromicized catgut. In one of these contributions (see Red Cross Notes, Series V, page 256) it was shown that guinea pigs vary greatly in their power to absorb buried catgut sutures, either plain or hardened. In a further contribution (see Red Cross Notes, Series VI, page 219) there was reported an elaborate series of experiments upon dogs and rabbits, wherein plain and hardened catgut was imbedded in abdominal and muscular tissues of both dogs and rabbits.

Rabbit II—Section of Muscle X 145. Ligature (2) opened into strands, the interstitial spaces heavily infiltrated with lymphocytes, intermixed with numerous polymorphonuclear leukocytes (1). More or less absorption indicated by the frayed out appearance of the ends of the strands.

This series led to the conclusion that the terms ten, twenty and thirty day catgut as applied to the hardened material could not be taken literally. It also demonstrated that catgut could be prepared by hardening the ribbon of intestinal tissue before twisting it, and that this process would produce a strand more uniformly hardened and with a more nearly definite time of absorption than is produced by any method whereby the hardening agent is applied after the strand has been twisted.

These experiments demonstrated that catgut cannot be prepared, the time of absorption of which may be stated in days or hours, but that a product could be made in which a given size in comparison with plain catgut of the same size, could be said to be of medium hardness, and another grade which might be said to be extra hard.

Rabbit II—Section of Peritoneum X 52. Ligature (2) imbedded in a mass of lymphocytes, intermixed with a few polymorphonuclear leukocytes (1). The ligature has opened into strands, the interstitial spaces of which are infiltrated with leukocytes.

In the foregoing series the mode of absorption and the phenomena in connection therewith were not recorded.

### Physiological Processes in Catgut Absorption.

With a view of obtaining some definite information upon the physiological process of absorption of catgut, a series of experiments were undertaken substantially as follows:

Strands of plain sterile catgut, about six inches in length, were imbedded in the peritoneal cavity of rabbits under aseptic conditions. The effect of the imbedding in the tissue was noted, and after a period varying from five days onward the rabbits were killed, the strand of catgut removed, sections being made for microscopic study, and the extent and mode of absorption observed. Likewise a piece of plain catcut one-half to one inch in length was imbedded in the muscles of the thigh of the animals, and the effect noted. Upon killing the animal the catgut was removed and sections prepared for microscopic study.

Rabbit III—Section of Muscle X 100. Ligature (2) opened into strands, between which there is an extensive infiltration of lymphocytes (1). In places the remnants of the strands have nearly become obliterated by the cell mass.

The actual phenomenon of absorption, as shown by these experiments, is very different from the history of the imaginary ideal ligature mentioned before. It is seen that catgut absorption is very gradual.

There is first a disintegration of the strand, shown chiefly by looseness and untwisting. This finally reaches a stage at which there is present only a soft pulpy material of no holding power. At this point the ligature or suture ceases to have value as such. After this the pieces of disintegrated catgut lie in the tissues for a number of days, gradually being replaced by connective tissue. This process is sometimes exceedingly slow.

The notes taken during these experiments were as follows:

Rabbit No. I. Killed 5th day.

Muscle—Area around the ligature slightly hyperaemic. The ligature appeared as a white mass through the muscle sheath.

Microscopic examination showed the ligature to be imbedded in a mass of cells.

Peritoneum.—The ligature is adherent to the large intestine and operation wound. The ligature is soft and swollen and is covered with a white exudate. On cutting the ligature the interior appears tough and resistant.

Rabbit IV—Section of Muscle X 100. Ligature (2) separating into small strands with infiltration of large numbers of lymphocytes (1).

Rabbit No. II. Killed after six days.

Muscle.—There is slight congestion around the ligature. The ligature is white and swollen. No bacteria were seen in these preparations.

Peritoneum.—The ligature lies free in the abdominal cavity but is surrounded by white deposit. It is soft and swollen, but the interior is still tough. No bacteria were found in the cellular deposit on the ligature.

Rabbit No. III. Killed after seven days.

Muscle.—There is slight congestion around the ligature. The ligature is swollen and surrounded by a white deposit.

Peritoneum.—The ligature is adherent to the small intestine and there is a slight inflammatory reaction at point of adherence. Cultures made from the ligature remained sterile.

Microscopic examination shows the ligature to be surrounded by a thick layer

of mononuclear cells, which have also penetrated in between the separating strands.

Rabbit No. IV. Killed after seven days.

Muscle.—There is slight hyperaemia around the ligature. The ligature is swollen and surrounded by a white deposit. Cultures made from scrapings show no growth.

Peritoneum.—The ligature is adherent to the large intestine and there is some hyperaemia at the point of attachment. Cultures made from the ligature remained sterile.

Rabbit IV—Section of Peritoneum X 52. Ligature (2) has not been very much acted upon. It is surrounded on both sides by a deposit of lymphocytes intermixed with a few polymorphonuclear leukocytes (1). In places there is a slight infiltration of leukocytes between the strands.

Rabbit V. Killed after eight days.

Muscle.—There is slight congestion around the ligature. The ligature is soft and surrounded by a white deposit.

Microscopic examination shows the ligature to be surrounded and infiltrated by cellular elements. The cells are mostly of the mononuclear type, but interspersed through some portions of the infiltrated area are large phagocytic cells that appear to have taken up fragments of the smaller cells. There is also evidence of the beginning of an infiltration of connective tissue cells, especially along the border.

Peritoneum.—The ligature is slightly adherent to the uterus and the small intestine. There is slight hyperaemia at the points of attachment. The ligature is soft and swollen. Cultures showed no bacteria.

Rabbit No. VI. Killed after nine days.

Muscle.—The ligature is not visible. It may have slipped out of the position in the muscle where it had been deposited.

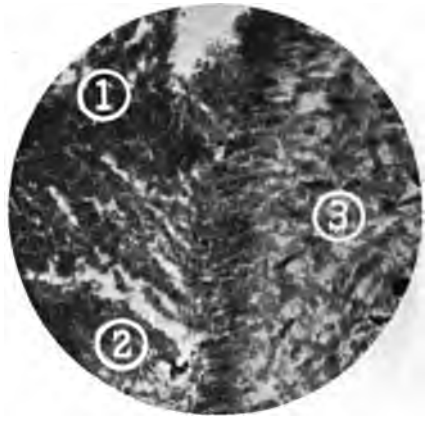
Microscopic examination failed to show any trace of the ligature in the portion preserved for study.

Peritoneum.—The ligature is adherent to the posterior abdominal wall. A few small hemorrhagic foci are seen at and near the points of attachment. Cultures show no bacteria.

Rabbit No. VII. Killed after ten days.

Muscle.—The ligature is swollen and surrounded by a white deposit. Cultures show no growth of bacteria.

On microscopic examination the ligature could not be found, but the cellular infiltration around it can be seen in the section.




Rabbit V—Section of Peritoneum X 200. Ligature (2) disintegrated, strands imbedded in a dense mass of leukocytes mostly of the lymphocyte type (1). The outer edges of the cell deposit show areas of well organized newly-formed connective tissue (3).

Peritoneum.—The ligature is slightly adherent to the abdominal wall and the anterior wall of the bladder. Cultures show no growth of bacteria.

Rabbit No. VIII. Killed after fourteen days.

Muscle.—The wound has completely healed. The ligature is surrounded by a mass of cells.

Peritoneum.—The ligature is adherent to the abuominal wall. It is swollen but still retains considerable resistance to tension. It is imbedded in fibrous tissue and surrounded by a relatively large mass of cells.

Rabbit IX. Died after fourteen days.

Muscle.—Ligature seems to be partly absorbed. The wound has healed.

Peritoneum.—The ligature is adherent to the anterior wall of the bladder and is partly imbedded in fibrous tissue.

Rabbit No. X. Died of septic peritonitis after twenty days.

Muscle.—The wound has healed. The ligature has apparently been absorbed.

Microscopic examination fails to show any trace of the ligature in the portion of muscle preserved for study. There is an area of apparently newly-formed connective tissue which may mark the border of the location where the muscle had been incised.

Peritoneum.—There is a marked fibrinous peritonitis. The ligature appears to have become disintegrated except a single mass of shreds.

Microscopic examination shows what appears to be a few shreds of the ligature imbedded in a mass of mononuclear cells.

Rabbit VI—Section of Peritoneum X 52. Ligature (2) has not opened into strands, but is surrounded by a dense mass of lymphocytes (1). Some infiltration between the strands. On sides of the cell deposit newly-formed connective tissue may be seen (3).

Rabbit VII—Section of Peritoneum X 100. Ligature (2) opened into strands, interstitial spaces infiltrated with leukocytes of the lymphocyte type, intermixed with polymorphonuclear leukocytes (1).

## The Resorption of Catgut.

In any attempt to explain what happens when a strand of catgut is sewn into living flesh we are beset with difficulties. Observations can be made at intervals only. The naked eye gives little or no indication of the process. Microscopic examinations can only be made after removal of a section of the tissue. It would be impossible to establish any continuous study because the process extends through days, even into weeks, of time. No two animals, especially no two rabbits, react alike; hence work cannot be exactly duplicated.

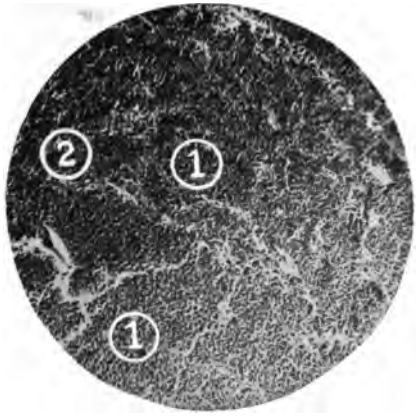
The processes are highly complex, involving the whole range of injury—inflammation, wound repair and wound healing.

Taking advantage of the knowledge which has been developed by research in cellular pathology, and assuming for the purpose of explanation the correctness of the theories propounded, we offer the following as a plausible insight as to what may have happened—as in the cases here enumerated—when a strand of catgut was imbedded in the flesh tissues of certain rabbits.

If a surgically clean knife or needle is passed into the tissues of a living animal (the tissues themselves having also been rendered aseptic), providing no large vessel be injured, repair will take place rapidly—union by first intention. In such a case the pre-existing cells of the injured tissue do their work with a reaction so slight as to scarcely be observable. Such a sequence of events occurs when the injury to the tissue is of the mildest form and when the events which follow are normal, are of common occurrence in modern surgery. If, however, an aseptic needle carrying an aseptic thread of silk, linen or like material should be passed into and through the living tissue, and a portion of the thread be allowed to remain imbedded in the tissue, we have introduced a foreign body that must be cared for.

It is a very common observation that an aseptic piece of silk or like material becomes encysted without noteworthy reaction and remains indefinitely in this condition, the tissues walling off the foreign body until the injury has been repaired by new cells.

One of our staff (Mr. Kilmer), in observations made on the introduction of foreign substances into the body of the lower type of organisms, such as sponges, jelly fish, etc., noted that when pieces of insoluble matter, as for example, bits of cord, iron, or charcoal, were implanted they were thrown out or else were at once surrounded by a viscous plasmodial mass, and became walled off from the surrounding tissue and tissue fluids, and in either case the injury rapidly healed. When, however, such a substance consisted of a portion of flesh the particle was surrounded by plasmodic cells, and in the course of time was disintegrated, dissolved and taken up by the body system. Here also there was a rapid regeneration and healing.




Rabbit VIII—Section of Muscle X 100. Few remaining strands of ligature (2) imbedded in a dense mass of lypmhocytes, intermixed with a few polymorphonuclear leukocytes (1).

In the case of implanting a cord of catgut into animal tissue, we have introduced new elements. Catgut is an animal substance—collagen (organized gelatine); implanted within the tissue and left to itself would decompose and become an irritant. The intention of introducing such a substance by the surgeon is that it shall perform its office as a ligature or suture for a required length of time and then be removed through agencies within the tissues themselves. It is a substance susceptible of disintegration and dissolution—it is an absorbable body—a food substance, and as such is dissolved, digested and assimilated by the cells of the injured body.

Thus in the series here cited we have a picture of strands of catgut placed in the peritoneal cavity of rabbits, or buried in muscular tissue, which upon examination after five days are found to be surrounded by a dense white deposit, and this appearance is marked until after the fourteenth day, after which there is a gradual absorption of the deposit as the ligature itself disappears.

Rabbit VIII—Section of Peritoneum X 100. Ligature (2) partially opened up into strands, the interstitial spaces of which have become infiltrated with lymphocytes (1); surrounding the ligature is an area of newly-formed connective tissue (3).

On sectioning the tissues containing the strands of catgut there is seen after five or six days a beginning of the process of disintegration; the ligature untwists and the interspaces fill up with a cellular infiltrate, consisting of small mononuclear and some polymorphonuclear leukocytes.

As the process proceeds the edges of the ligatures show evidence of solution, and the cells infiltrate in between the separating strands. These strands gradually dissolve, and in the later stages disappear entirely.

After varying periods (generally fourteen days) there is considerable evidence of the reparative processes which follow; the exterior of the ligature is covered by newly formed connective tissue, and the connective tissue cells begin to penetrate into the interior of the mass.

Rabbit IX—Section of Muscle X 100. Moderate disintegration of the ligature into strands (2), which are separated in places by an infiltration of lymphocytes (1), and connective tissue cells (3).

The polymorphonuclear cells seem to disappear after periods varying from the seventh to the tenth day, leaving the mononuclear cells to continue the process. About the fourteenth day large mononuclear phagocytic cells seem to have invaded the mass, and these are no doubt instrumental in removing the remains of the strands of the disintegrated ligature and of the dead cells, as these bodies seem to be loaded up with foreign materials.

After the ligature is dissolved the process appears to run a course parallel with that of ordinary tissue repair, and the whole area occupied by the

Rabbit IX—Section of Peritoneum X 52. Marked disintegration of the ligature (2) into strands. Interstitial spaces heavily infiltrated with lymphocytes and polymorphonuclear leukocytes (1), and to some extent with connective tissue cells (3).

ligature is finally replaced by newly formed fibrous tissue.

The disintegration of the ligature itself seems to be brought about by digestive ferments which are either brought to the place in the blood stream, or, what is more probable, by ferments generated by the infiltrating cells themselves.

---

Hand Book of Ligatures, a handsomely illustrated book of forty pages, describing methods of preparing ligatures, sizes, styles of packing, tests, etc. Sent free on request.

Watery solutions and all astringent chemicals, such as tannin, mercuric cloride, chromic acid, alum, etc., render catgut brittle and weak.

When catgut is knotted its strength is considerably lessened.

In ordering, specify Red Cross Ligatures.

Ligatures were used for tying the blood vessels in the fourth century. Pare introduced this method in the 16th century. Physic, 1814, was the first to demonstrate the practical advantages of the animal ligature; he used chamois leather. Sir Astley Cooper, 1817, was the first to suggest violin strings.

Sir Joseph Lister, 1869, introduced prepared (antiseptic) catgut.

Write for a sample of Red Cross Catgut.

# PREPARATION OF SURGICAL CATGUT

**The notes here given in relation to the preparation of catgut in foreign countries were gathered by a special representative who visited the abattoirs in order to collect at first hand actual knowledge of the conditions present.**

The commercial preparation of the intestines of animals, otherwise known as catgut, is an industry very largely confined to the continent of Europe. Scattered over Italy, France and Germany, with only a few in Great Britain, are small places devoted to this work. These are classed as among the disagreeable manufactures or nuisances, and by the authorities and by residents in the vicinity are considered more objectionable than the fertilizer factories in our own country. Generally they are entirely separate and distinct from the slaughter houses. In some instances the slaughter houses are notable for their cleanliness, and the scientific methods employed therein. In certain localities it seems to be the rule that in order to bring up the standard of the slaughter house, the handling of the visceral contents is avoided, and they are removed to points remote from sanitary supervision. In the most acceptable abattoirs the intestinal contents are thrown into tubs or barrels and carried to the suburbs, here to be turned over to a contractor, in whose hands the subsequent manipulations are carried out.

The prevailing conditions are certainly not those usually surrounding the preparation of surgical material. For the most part the preparation of strings for surgical use is of secondary importance, the greater attention being paid to the preparation of sausage casings, racket and bow strings, musical strings, whip cords, clock weight cords, etc., and in some instances it was noted that strings unsuitable for commercial purposes were culled out and sold for surgical catgut. In scarcely any of the places visited was there a semblance of order or cleanliness. Universally there was a lack of light and air, and a notable absence of a plentiful supply of water. Excretions, flies, dirt, stagnation and filth were everywhere. In many places visited by our representative the spectacle presented and the impression received were indescribable, the sights nauseating and, as one observer noted, "the smells were abominable."

Illustration showing portion of room where catgut is disinfected and twisted into strands.

The intestines are handled by methods which seem very crude, unsanitary and unclean. Generally the intestines are dumped upon dirty floors or wooden platforms, sometimes received in tubs or barrels which apparently were never clean nor could they be cleaned. Blood and offal blocked the sewers and operatives in wooden soled sabbatons were wading in the oozing filth. In some instances it was found to be the practice to allow the intestines, still holding their contents, to ferment for some days. It was stated that this process made them more easily scraped, and that the final product was more soft and supple.

The smaller slaughter houses supply a considerable amount of material. In these places the intestines are emptied of their contents, scantily washed, a small amount of water being used for a large amount of material. They are then dried and sold to the maker of gut products, who in turn apportions it out to families who soak out and dry the material and then twist it, as a home industry. At every step there seems to be ample opportunity for putrefaction and for infection of many sorts.

In the United States there are practically no makers of surgical catgut other than Johnson & Johnson and the J. Elwood Lee Company. Those makers who supply and manipulate the material purchase the imported strings. The factories in this country where animal intestines are handled devote their attention to the making of sausage covers, tennis strings and the like, this for the reason that the making of such articles is the more profitable. It is also true that in order to supply the demand it is necessary to import a large amount of the crude dried intestines.

### The Newer Processes.

We have entirely reversed these slaughter house procedures. Under the methods of animal inspection now in vogue in this country we have little difficulty in procuring tissues from healthy animals, or at least those which are not infected with tetanus, anthrax, or other organisms of grave lesions. We are also succeeding in securing materials from animals which as a rule give a desirable product. We find that in the older animals the tissues are thicker, larger and darker in color. There are other variations which are apparently dependent upon the breed of the animal, the method by which it has been fed and handled, and still

Illustration showing a portion of the catgut laboratories, the handling of raw catgut and placing in packages preparatory to sterilization.

other factors, the nature of which are not altogether determined, which affect the color, strength and pliability of the tissues.

In our work immediately upon the removal of the intestines they are placed in troughs of stone or slate, flushed with hot and cold water. Here the greater portion of the intestinal contents, blood and foreign matter, are washed away, the troughs are drained and the fat and organs are removed. The large intestines, the stomach, etc., are separated from the smaller ones; the small intestines which we use are then placed in a trough or vat containing a disinfectant and at this point begins the true work of cleansing and disinfection. From here on for days, at times for a week or more, the intestines are being continually washed in disinfecting and cleansing solutions.

The process, in brief, consists of passing the intestinal tubes from one vat to another. The material is continuously flushed, squeezed through rollers and washed, emerging from the process in the shape of strings about sixty feet in length. (The nature of this string is somewhat graphically illustrated upon the reel shown on the front cover of this issue).

During these processes the material is passed through a series of rollers, the object of which is to loosen and scrape away the spongy villi layers. Further manipulation consists in the so-called splitting of the gut. Take a piece of rubber tubing and with a knife or shears split it so that it is in two halves; this will give an accurate representation of the process, except that it is done by special machinery, whereby the material is stretched, as for example over a rod, and an upright knife does the splitting, the material passing from the solution to the machine and being delivered into another solution at the completion of the process. The process of splitting is illustrated on the front page of the cover of this issue. The scraping process follows the splitting process upon the split gut, as it precedes it upon the whole gut. It consists in drawing the gut repeatedly against the dull edges by the means of rollers. This weakens and removes the mucous layers, in a measure scrapes them off, and has a tendency to make the material pliable, transparent, smooth, and of equal thickness. Upon the thoroughness of this process depends the texture and strength of the finished strand, and it necessarily includes repeated washings, flushings and final removal of all chemicals.

Illustration of a portion of the catgut sterilization room, showing apparatus for thermo sterilization.

In our work at the completion of this process the gut is placed in jars containing an antiseptic solution and sent to the twisting laboratory.

The next stage is that of twisting. The smaller size guts are made by simply twisting one strand of the tissue material, the larger sizes by two-ply, three-ply, etc., but the sizes further depend upon the thickness of the tissue. Hence the sizing at the time of twisting is only approximate, and they are carefully re-sized. The process of twisting or torsion is self-explanatory. To simply twist any loose cord illustrates the process. Twisting can be performed with the fingers, or with an apparatus, one end being held while the other end is rotated.

The room in which this twisting is done is shown on page ten of this issue. Here the twisting is being done on the center table, and the catgut is shown in various portions of the room in jars. After twisting a peg is slipped through a loop at each end and it is dried, as shown in the illustration. During this drying it is rubbed down, smoothed and polished.

The above processes may be summarized by stating that they consist essentially of a continuous disinfecting and washing of the loose untwisted string. In such processes the introduction of putrefactive material which obtains in the usual slaughter house processes is prevented, if present we remove these products. An important point is to prevent decay. In the usual method of manufacturing these strings they are allowed to ferment for four or five days in order that the splitting, scraping, may be more easily performed. On the other hand, it may be noted that our catgut is somewhat stiffer, for the very reason that we do not allow this fermentation which, while it might increase the pliability, would also increase the growth of organisms and other products.

The catgut is next sized and tested for tensile strength, which processes are elsewhere described. It is then packed in containers such as tubes, tanks or bottles, or made into coils for the so-called raw gut. If it is to be impregnated with antiseptics or chromicized, this is done before the twisting. The process of chromicizing is explained in the "Hand Book of Ligatures," and elsewhere in this issue.

### Sterilization of Catgut.

It is obvious that the problem of the sterilization of catgut presents a different aspect when applied to material produced under the methods described elsewhere, than when sterilization is attempted with the twisted cord, or the catgut of commerce. In the finished ligature prepared by the newer processes herein described the outcome is a cord made up of healthy, normal, animal tissue. The ordinary infection if present, is removed. Putrid material common under the ordinary method is eliminated. In fact, infection is confined to the surface of the cord or such as may arise in its handling after twisting. At the time of torsion the strands are practically aseptic. There only remains, therefore, a final re-sterilization after the packing of the catgut within its container.

In these laboratories this re-sterilization is carried out under various methods, according to the style of package, as, for example, envelopes, glass tubes, tank packages, etc. The sterilization is carried out within the sealed containers, which containers protect the ligatures from subsequent contamination until they are opened by the surgeon.

The following processes have been employed:

Alcohol—Boiling under pressure, 240 to 255 degrees, carried out in an autoclav.

Thermol. sterilization by cumol—Boiling in cumol at a temperature of 320 to 340 degrees Fahrenheit.

Mixed Methods—The use of chemicals, disinfectants and heat combined or successively, e. g., mercuric salts, cresols, carbolic acid, formalin, peroxide of hydrogen, etc.

After such re-sterilization process the strands are subjected to bacteriological check tests, as elsewhere described.

Hand Book of Ligatures, a handsomely illustrated book of forty pages, describing methods of preparing ligatures, sizes, styles of packing, tests, etc. Sent free on request.

## BACTERIOLOGICAL TESTS FOR OUR LIGATURES.

An important feature of the preparation of ligatures in the laboratories of Johnson & Johnson and the J. Ellwood Lee Company is the check-test made by the bacteriological department.

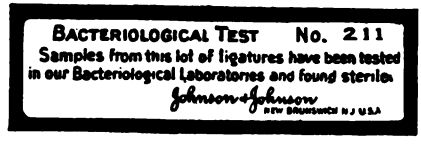
In the case of sealed tubes and envelopes a bacteriological test is made of each lot sent to the stock room, the test is recorded and its serial number placed on the label of each package, thus making it possible for the buyer or the surgeon to refer to the actual culture test from the lot which is being used. In addition to this regular test, control tests are made from time to time.

Tube containing nutrient bouillon into which a strand of catgut has been placed for testing.

The details of these tests have been explained in our literature and are substantially as follows:

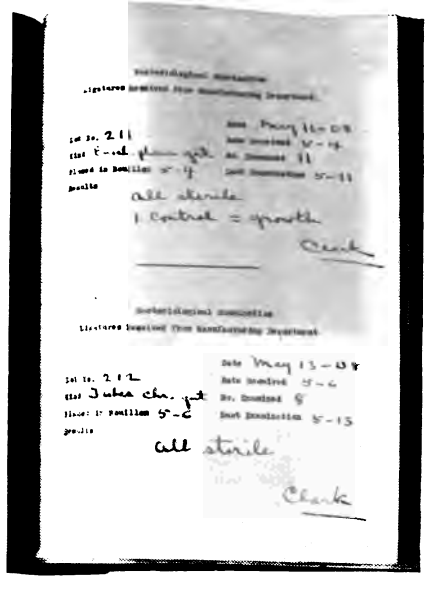
Each batch of ligatures as finished is sent to the laboratory. From this batch a certain number of samples is taken and, under proper aseptic precautions, the package is opened, the ligature strand removed from its container with sterile forceps, and dropped into a tube of prepared sterile nutrient bouillon. This is subjected to proper temperature for at least one week, and if at the end of that time no growth has taken place that fact is considered as conclusive proof that the whole batch is sterile, and the package is labelled with a label similar to that shown in the cut herewith.

These tests are supplemented from time to time by microscopical examinations and other methods of procedure. A simple but complete system


BACTERIOLOGICAL TEST No. 211
Samples from this lot of ligatures have been tested in our Bacteriological Laboratories and found sterile.
Johnson & Johnson
NEW BRUNSWICK N.J. U.S.A.

has been worked out to insure accuracy. The tests go above and beyond surgical requirements.

Among the several hundred known species of bacteria only a few are capable of producing wound infection. The tests here enumerated eliminate




all bacteria both in preparing the ligatures and in handling them in the testing laboratory.

The bacteriological check-tests of these ligatures run into many thousand. A sample page of the records is here shown. These bacteriological tests are the most perfect means which could be devised to verify the efficiency of the sterilization process, and each is a guarantee of the perfection of the sterilization.

## TENSILE STRENGTH OF LIGATURES.

In the case of catgut, the tensile strength is often an element for discussion, but Johnson & Johnson and J. Elwood Lee Co. make use of testing machines for this purpose, so that there is no guess work about it. Catgut is sometimes returned to the laboratory reported to be defective in strength, and when actually tested is

Apparatus for Testing Strength of Catgut

found to be up to the standard. The machine simply registers the number of pounds necessary to break catgut or silk.

Most complaints about strength of catgut are due to the fact that the surgeon has had trouble from the catgut breaking at the knot, which is generally caused by tying with a jerk, as catgut can always be broken off at a knot in that way.

In these laboratories strands from every coil are carefully tested for tensile strength, and no catgut is used which does not stand the required number of pounds. Generally, however, our catgut runs very much above the standard in use, but the standard adopted has been in our experience a fair average of what should be expected of a good quality catgut.

### STANDARD TENSILE STRENGTH FOR SURGICAL CATGUT.

| No. | Lbs. | No. | Lbs |
|---|---|---|---|
| 00 | 5 | 4 | 30 |
| 0 | 7 | 5 | 40 |
| 1 | 10 | 6 | 45 |
| 2 | 15 | 7 | 50 |
| 3 | 22 | | |

Concerning silk ligature material not much trouble is ever experienced by the surgeon, because silk is actually much stronger than catgut and also because it is not so easily harmed by careless or severe treatment, or any of the other influences which are known to affect catgut with such destructive results. There is, however, a complete set of standards for both our Twisted and Braided silk ligatures, statement of which follows:

### STANDARD TENSILE STRENGTH FOR WHITE TWISTED SILK.

| No. | Lbs. | No. | Lbs. |
|---|---|---|---|
| 1 | 1 | 11 | 10 |
| 2 | 1½ | 12 | 11½ |
| 3 | 2 | 13 | 14 |
| 4 | 2½ | 14 | 18 |
| 5 | 3½ | 15 | 22 |
| 6 | 4 | 16 | 26 |
| 7 | 5½ | 17 | 30 |
| 8 | 6½ | 18 | 38 |
| 9 | 7 | 19 | 42 |
| 10 | 8½ | 20 | 48 |

### STANDARD TENSILE STRENGTH FOR WHITE BRAIDED SILK.

| No. | Lbs. | No. | Lbs. |
|---|---|---|---|
| 1 | 3 | 11 | 26 |
| 2 | 4 | 12 | 33 |
| 3 | 5 | 13 | 38 |
| 4 | 7 | 14 | 44 |
| 5 | 9 | 15 | 46 |
| 6 | 11 | 16 | 52 |
| 7 | 14 | 17 | 60 |
| 8 | 16 | 18 | 66 |
| 9 | 19 | 19 | 70 |
| 10 | 22 | 20 | 75 |

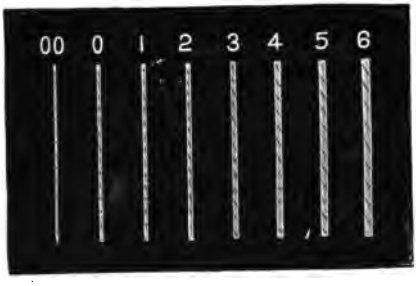
## LIGATURE SIZES.

In order to bring about uniformity of measurement, Johnson and Johnson and J. Ellwood Lee Co. have adopted a rational scale for catgut. This scale is based upon thousandths of an inch, each size being three-thousandths increase over the next smaller one.

### CATGUT SIZE SCALE.

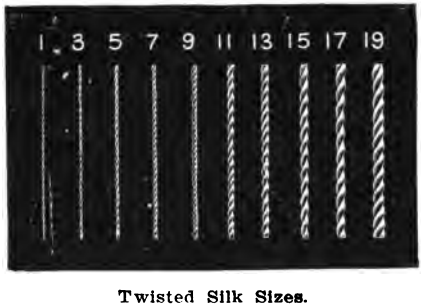
| No. | Thousandths | No. | Thousandths |
|---|---|---|---|
| 00 | 12 | 4 | 27 |
| 0 | 15 | 5 | 30 |
| 1 | 18 | 6 | 33 |
| 2 | 21 | 7 | 36 |
| 3 | 24 | | |

In gauging catgut these sizes are adhered to as closely as possible, but of course with catgut some slight variations in size cannot be avoided because individual strands vary considerably in different parts.




Catgut Sizes.

The sizes of silk ligature are not so easily standardized and the scale in use conforms in general to the commercial standard of the silk market, in which the size is estimated by the number of yards per ounce. The sizes in use run from No. 1, the finest, to No. 20, the coarsest. We give the approximate yardage as follows:




Twisted Silk Sizes.

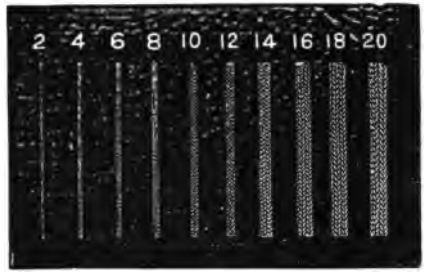
WHITE TWISTED SILK.

| No. | Yds. to Oz. | No. | Yds to Oz. |
|---|---|---|---|
| 1 | 2265 | 11 | 299 |
| 2 | 1865 | 12 | 232 |
| 3 | 1532 | 13 | 170 |
| 4 | 1198 | 14 | 136 |
| 5 | 932 | 15 | 115 |
| 6 | 765 | 16 | 95 |
| 7 | 565 | 17 | 80 |
| 8 | 465 | 18 | 65 |
| 9 | 444 | 19 | 50 |
| 10 | 365 | 20 | 40 |

WHITE BRAIDED SILK.

| No. | Yds. to Oz. | No. | Yds to Oz. |
|---|---|---|---|
| 1 | 670 | 11 | 90 |
| 2 | 414 | 12 | 80 |
| 3 | 356 | 13 | 63 |
| 4 | 320 | 14 | 50 |
| 5 | 223 | 15 | 45 |
| 6 | 177 | 16 | 41 |
| 7 | 170 | 17 | 36 |
| 8 | 148 | 18 | 31 |
| 9 | 120 | 19 | 28 |
| 10 | 103 | 20 | 24 |

The ordinary sizes mostly in demand and generally known as fine, medium and coarse, are Nos. 5, 9 and 12 Twisted Silk, and Nos. 4, 7 and 10 Braided Silk. These sizes are always sent on orders where sizes are not stated, or where fine, medium and coarse are specified.




Braided Silk Sizes.

## CATGUT NOTES.

It is supposed that the ancient makers of violin strings used feline intestines, hence the name catgut. In ancient Rome violin strings were made from the intestines of the lions and tigers who died in the arena.

Again, catgut is supposed to have been originally "kitgut" or "kitstring," kit meaning a fiddle.

Modern catgut is in reality sheep's gut.

The ancients used silk fiber, hemp, linen, cotton and metallic wire for sutures.

Animal tissue sutures were used by Albucasis 100 A. D.

Anthrax has been communicated to man through infected catgut.

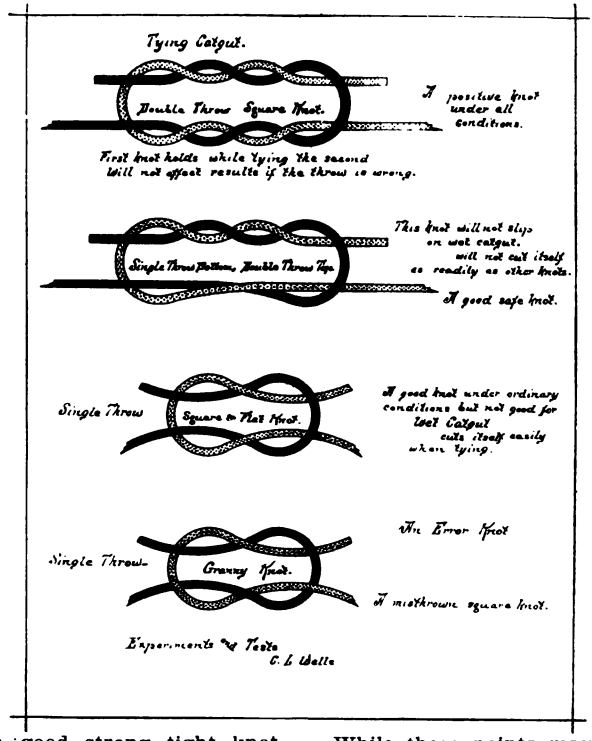
The first truly aseptic catgut ligatures ever placed upon the market were the Red Cross Ligatures made in the laboratories of Johnson & Johnson.

## TYING THE KNOT.

Without experimenting a little with knots in catgut it is difficult for any one to realize how poorly ordinary methods of tying are found to hold when applied to wet catgut. What is apparently a good strong tight knot pulls out with the greatest ease.

Most every one knows the difference between the wrong kind of knot, called the granny knot, and the correctly tied flat or square knot, but neither of these will hold for a moment when tied in wet catgut.

On the other hand, if a double throw is made both in the first and second turn, the best results possible are secured, and it makes no difference whether it is a double throw granny knot or a double throw square knot.


Tying Catgut.
Double Throw Square Knot.
A positive knot under all conditions.
First knot holds while tying the second will not affect results if the throw is wrong.
Single Throw Bottom, Double Throw Top.
This knot will not slip on wet catgut. will not cut itself as readily as other knots.
A good safe knot.
Single Throw
Square or Flat Knot.
A good knot under ordinary conditions but not good for Wet Catgut cuts itself easily when tying.
An Error Knot
Single Throw
Granny Knot.
A misthrown square knot.
Experiments & Tests
C. L. Bolle

While these points may seem to be unimportant, yet they are really of the very greatest importance, and there is no doubt that much trouble is experienced sometimes after operations because of the slipping of knots tied in catgut ligatures and sutures.

---

Even infected catgut ligatures will not lead to such long standing fistula as sometimes follow the retention of infected silk ligatures in the abdominal cavity. The catgut is finally absorbed.

In ordering, specify Red Cross Ligatures.

Various animal tissues have been suggested and used as ligature material. Kangaroo tendon, tendon from rabbit's ear, mouse's tail, sinews of deer, calf, horse hair, etc.

Write for a sample of Red Cross Catgut.

In ordering, specify Jelco Ligatures.

## NEWER CATGUT.

In this issue of "Red Cross Notes" there are described the methods used in the laboratories of Johnson & Johnson and the J. Ellwood Lee Company for the preparation of surgical catgut. These methods we believe to be the most important step in catgut preparation made since the classic mode of Lister. In carrying out the process an attempt is made to apply the methods of surgical procedure in abdominal operations to the removal and preparation of sheep's intestines for surgical purposes. Under these methods we control the entire process from the living animal to the strand as it is used by the surgeon. The preparation begins at the moment the tissue is removed from the animal, all of the manipulations are carried on with a full consideration of the use to which it is to be put. The methods are in brief as follows:

The selection and separation of the intestines under cleanly conditions.

The immediate disinfection and cleansing of the separated tissue.

The cleansing and disinfection of each fiber before making into strings.

The sterilization of the string before torsion.

The disinfection of the strings, and handling under aseptic conditions.

The final packing and resterilization in the sealed containers.

The finished catgut made by this process is a cord made up of healthy animal tissue, sterilized, aseptic, and unchanged in character.

Catgut prepared under this process is packed in breakable tubes, tank, packages, envelopes and other forms, all of which are sterilized within the container and after sterilization subjected to bacteriological check tests.

The processes and the various forms in which ligatures are furnished are described throughout this issue and illustrated upon the covers.

Johnson & Johnson, New Brunswick, N. J.

# LIST OF LIGATURES.

**For convenience in ordering, a list of the more popular and desirable forms ligature packages of the manufacture of Johnson & Johnson and the J. Ellwood Lee Company are here given. The forms listed are illustrated in colors upon the covers of this issue of the "Red Cross Notes." A full list of the ligature material prepared in these laboratories will be found in the pamphlet entitled "A Hand Book of Ligatures." A copy of this book may be obtained on application to Johnson & Johnson.**

## CATGUT.

### Red Cross Envelopes, Catgut

| | |
|---|---|
| Regular ass't sizes.....doz. env. | $0.75 |
| Ass't sizes 4, 5 and 6..doz. env. | .90 |
| Box of 100 env. reg. ass't per box | 5.00 |
| Box of 100 env. ass't 4, 5 and 6 per box | 6.00 |
| Emergency, with needles doz. env. | 1.50 |

Each envelope contains 28 inches of catgut.

Regular stock sizes are Nos. 1, 2 and 3.

Plain catgut, medium hard chromic and extra hard chromic.

Medium hard chromic sent on all orders for chromic gut unless extra hard is specified.

Envelopes are packed one doz. in a box, either assorted sizes in each box or all one size as desired.

Also packed 100 in a box, assorted or all one size as desired.

Also put up with threaded needle in each envelope (emergency). Half-curved needles only. Chromic catgut cannot be put up with needles. In ordering Emergency catgut, specify only the size of suture desired. The correct size of needle to fit the suture is supplied by us.

### Red Cross Tubes, Catgut "Breakable"

| | |
|---|---|
| Catgut, plain .....doz. tubes | 3.00 |
| Catgut, chromic .....doz. tubes | 3.00.. |

### Lee's "Breakable" Tubes Catgut

| | |
|---|---|
| 2085 Catgut, plain.....doz. tubes | 3.00 |
| 2084 Catgut, chromic..doz. tubes | 3.00 |

Sealed, breakable glass tubes containing the catgut preserved in the sterilizing liquid.

Each tube contains 10 feet of catgut.

Regular stock sizes are Nos. 1, 2 and 3.

Plain catgut, medium hard chromic and extra hard chromic. Medium hard chromic sent on all orders for chromic gut unless extra hard is specified.

Each tube in an individual box and 1 doz. of these in an outside box.

Packed assorted sizes in each outside box or all one size as desired.

This style is not supplied with needles.

### Wood's Tubes, Catgut.

| | |
|---|---|
| Catgut, plain .....per doz. tubes | 2.00 |
| Catgut, chromic ..per doz. tubes | 2.00 |

Sealed, breakable glass tubes containing the catgut preserved in the sterilizing liquid.

Each tube contains 30 inches of catgut.

Regular stock sizes of catgut are Nos. 1, 2 and 3.

Plain catgut, medium hard chromic and extra hard chromic. Medium hard chromic sent on all orders for chromic gut unless extra hard is specified.

Each tube packed in an individual box and 1 doz. of these in an outside box.

Packed assorted sizes in each outside box or all one size as desired.

This style is not supplied with needles.

### Red Cross Emergency Tubes, Catgut "Breakable."

| | |
|---|---|
| Catgut .....per doz. tubes | 1.80 |

Each tube contains 17 inches of catgut threaded in a needle of proper size.

Regular stock sizes are Nos. 1, 2 and 3.

Size of needle need not be specified. Half-curved needles only are supplied.

Chromic cannot be supplied with needles.

Each tube packed in an individual box and 1 doz. of these in an outside box.

Packed assorted sizes in each outside box, or all one size as desired.

### Zonas Catgut.

| | |
|---|---|
| Regular envelopes.....per doz. | 1.25 |
| Large envelopes.....per doz. | 2.50 |

Put up only in envelopes.

Contains silver iodide twisted into the strands and is yellow in color.

Prepared only in sizes 1, 2, 3 and 4.

Not prepared chromicized nor treated in any other way.

Zonas catgut cannot be put up with needles.

Regular envelopes each contain 28 inches of catgut.

Packed 1 doz. envelopes in a box.

Assorted sizes in a box or all one size as desired.

Large envelopes each contain 10 feet of catgut.

Packed 1 doz. envelopes in a box.

Assorted sizes in a box or all one size as desired.

### Lee's Small Size Breakable Tubes
#### Catgut.

Catgut, plain .....per doz. tubes 2.00
Catgut, chromic ..per doz. tubes 2.00

Sealed, breakable glass tubes containing the catgut preserved in the sterilizing liquid.
Each tube contains 5 feet of catgut.
Regular stock sizes are Nos. 1, 2 and 3.
Plain catgut, medium hard chromic and extra hard chromic. Medium hard chromic sent on all orders for chromic gut unless extra hard is specified.
Three tubes packed in a flat box.
Packed assorted sizes in each box, or all three of one size as desired.
This style is not supplied with needles.

### Lee's Emergency Tubes, Catgut.

Catgut, plain .....per doz. tubes 1.80

Sealed, breakable glass tubes containing the catgut and needle preserved in the sterilizing liquid.
Each tube contains 17 inches of catgut, threaded in a needle of proper size.
Regular stock sizes of catgut are Nos. 1, 2 and 3.
Size of needle need not be specified.
Straight, half-curved and full-curved needles supplied.
Chromic catgut cannot be supplied with needles.
Packed 1 doz. tubes on a card, each card in a box.
Packed assorted sizes of catgut and assorted shapes of needles on each card.

#### Without Needles.

Catgut, plain .....per doz. tubes 1.40
Catgut, chromic...per doz. tubes 1.40

Each tube contains 17 inches of catgut.
Regular stock sizes of catgut are Nos. 1, 2 and 3.
Plain catgut, medium hard chromic and extra hard chromic.
Packed 1 doz. tubes on a card, each card in a box.
Packed assorted sizes on each card or all one size as desired.

### Lee's Tank Package Catgut.

No. 1. One-spool tank.
Catgut Plain.....doz. tanks 3.60
Catgut, Chromic.....doz. tanks 3.60

Glass containers with the catgut wound on a glass spool and arranged to be drawn out through a rubber stopper.
Preserved in the sterilizing liquid.
Each tank contains about 10 feet of catgut.
Regular stock sizes are Nos. 1, 2 and 3.
Plain catgut, medium hard chromic and extra hard chromic.
Medium hard chromic sent on all orders for chromic unless extra hard is specified.
Each tank packed in an individual box and 1 doz. of these in an outside box.
Packed assorted sizes in each outside box or all one size as desired.
This style cannot be supplied with needles.

### Lee's Tank Package, Catgut.
#### Three-spool Tank.

Catgut, plain .....doz. tanks 7.50
Catgut, chromic .....doz. tanks 7.50

Glass containers with the catgut wound on three glass spools, each arranged to be drawn out through a rubber stopper.
Preserved in the sterilizing liquid.
Each tank contains about 10 feet of catgut on each spool, or about 30 feet in all.
Regular stock sizes are Nos. 1, 2 and 3, catgut in each tank.
Always assorted sizes in each tank.
Plain catgut, medium hard chromic or extra hard chromic, but only one variety in any one tank.
Medium hard chromic sent on all orders for chromic unless extra hard is specified.
Each tank packed in an individual box and 1 doz. of these in an outside box.
This style cannot be supplied with needles.

## SILK.

### Red Cross Envelopes, Silk.

Regular assorted sizes..doz. env. .75
Box of 100 env. reg. ass't.per box 4.50
Emergency with needles.doz. env. 1.50

Each envelope contains 1 yard of silk.
Regular stock sizes twisted silk are Nos. 5, 9 and 12.
Regular stock sizes braided silk are Nos. 4, 7 and 10.
Envelopes are packed 1 doz. in a box, either assorted sizes in each box, or all one size as desired.
Also packed 100 in a box, assorted or all one size as desired.
Also put up with threaded needle in each envelope (emergency).
Half-curved needles only.
Specify only the size of suture desired. The correct size of needle to fit the suture is supplied by us.
This style supplied in white silk only.

### Red Cross Tubes, Silk.
#### "Breakable."

Twisted Silk .....doz. 3.00
Braided Silk .....doz. 3.00

### Lee's "Breakable" Tubes, Silk

2087, Twisted Silk.....doz. 3.00
2086, Braided Silk.....doz. 3.00

Sealed, breakable glass tubes containing the silk preserved in the sterilizing liquid.

Each tube contains 4 yds. of silk.
Regular stock sizes twisted silk are Nos. 5, 9 and 12.
Regular stock sizes braided silk are Nos. 4, 7 and 10.
Each tube packed in an individual box and 1 doz. of these in an outside box.
Packed assorted sizes in each outside box, or all one size as desired.
These styles supplied only in white silk, cannot be supplied with needles.

### Wood's Tubes, Silk.

Twisted Silk..... per doz. tubes 2.00
Braided Silk.....per doz. tubes 2.00

Sealed, breakable glass tubes containing the silk preserved in the sterilizing liquid.
Each tube contains 1 yard of silk.
Regular stock sizes twisted silk are Nos. 5, 9 and 12.
Regular stock sizes braided silk are Nos. 4, 7 and 10.
Each tube packed in an individual box and 1 doz. of these in an outside box.
Packed assorted sizes in each outside box or all one size, as desired.
This style supplied in white silk only.

### Red Cross Emergency Tubes, Silk, "Breakable."

Twisted Silk..... per doz. tubes 1.80
Braided Silk.....per doz. tubes 1.80

Each tube contains 17 inches of silk threaded in a needle of proper size.
Regular stock sizes of twisted silk are Nos. 5, 9 and 12.
Regular stock sizes of braided silk are Nos. 4, 7 and 10.
Size of needle need not be specified.
Half-curved needles, only are supplied.
Each tube packed in an individual box and 1 doz. of these in an outside box.
Packed assorted sizes in each outside box, or all one size as desired.
This style supplied in white silk only.

### Lee's small Size Breakable Tubes Silk.

Twisted Silk.....per doz. tubes 2.00
Braided Silk.....per doz. tubes 2.00

Sealed, breakable glass tubes containing the silk preserved in the sterilizing liquid.
Each tube contains 2 yards of silk.
Regular stock sizes are Nos. 5, 9 and 12 twisted silk, and Nos. 4, 7 and 10, braided silk.
Three tubes packed in a flat box.
Packed assorted sizes in each box or all three of one size, as desired.
This style supplied in white silk only; cannot be supplied with needles.

### Lee's Emergency Tubes, Silk.

Twisted Silk.....per doz. tubes 1.80
Braided Silk.....per doz. tubes..1.80

Sealed breakable glass tubes containing the silk and needle preserved in the sterilizing liquid.
Each tube contains 17 inches of silk, threaded in a needle of proper size.
Regular stock sizes of twisted silk are Nos. 5, 9 and 12.
Regular stock sizes of braided silk are Nos. 4, 7 and 10.
Size of needles need not be specified.
Straight, half-curved and full-curved needles supplied.
Packed 1 doz. tubes on a card, each card in a box.
Packed assorted sizes of silk and assorted shapes of needles on each card.

### Without Needles.

Twisted Silk.....per doz. tubes 1.40
Braided Silk.....per doz. tubes 1.40

Each tube contains 17 inches of silk.
Regular stock sizes of twisted silk are Nos. 5, 9 and 12.
Braided silk, Nos. 4, 7 and 10.
Packed 1 doz. tubes on a card, each card in a box.
Packed assorted sizes on each card or all one size, as desired.
These styles in white silk only.

### Lee's Tank Package, Silk.

No. 1—One-spool Tank.
Twisted Silk.....doz. tanks 3.60
Braided Silk ..... doz. tanks, 3.60

Glass containers with the silk wound on a glass spool and arranged to be drawn out through a rubber stopper.
Preserved in the sterilizing liquid.
Each tank contains about 4 yds. of silk.
Regular stock sizes twisted silk are Nos. 5, 9 and 12.
Regular stock sizes braided silk are Nos. 4, 7 and 10.
Each tank packed in an individual box and 1 doz. of these in an outside box.
Packed assorted sizes in each outside box or all one size as desired.
This style supplied in white silk only; cannot be supplied with needles.

### Lee's Tank Package, Silk.

Three-spool tank.
Twisted Silk .....doz. tanks 7.50
Braided Silk.....doz. tanks 7.50

Glass containers with the silk wound on three glass spools, each arranged to be drawn out through a rubber stopper.
Preserved in the sterilizing liquid.
Each tank contains about 4 yards of silk on each spool or about 12 yards in all.
Regular stock sizes twisted silk are Nos. 5, 9 and 12.
Regular stock sizes braided silk are Nos. 4, 7 and 10.
Always assorted sizes in each tank.
Only one kind of silk in a tank, never both twisted and braided silk.
Each tank packed in an individual box and 1 doz. of these in an outside box.
This style supplied in white silk only; cannot be supplied with needles.

# LIGATURE BIBLIOGRAPHY

**The literature covering the subject of ligatures is very extensive, especially since the beginning of the present system of modern surgery. Catgut alone has been a fruitful theme for writers, the index of which would run into several thousand titles. The columns of Red Cross Notes have from time to time added their quota and we are also led to believe that the articles which have so appeared have been helpful in the general discussion of the subject.**

**The following is a list of the principal articles which have appeared in Red Cross Notes.**

"The Jersey Microscopists and the Germs in Catgut, Red Cross Notes Series I, No. 1, page 4. Description and slides of cultures of the bacillus anthrax obtained from catgut.

"Catgut," Series I, No. 6, page 4. Announcement and description of catgut, or catgut sterilized within protecting envelopes.

"Infected Sheep's Intestines," Series I, No. 9, page 2. Description of the nature and source of ordinary catgut in the market. In the same number appears a description of the method of preparation of Red Cross Ligatures, and historical notes upon catgut tissue.

"Catgut Sterilization," Series III, page 109. Description and experimental tests of the cumol method of sterilization, Johns Hopkins University.

"Suture Material," Series III, page 114. A discussion of absorbale and non-absorbale suture material.

"Catgut Sizes," Series III, page 128. A discussion of the letters and numbers used to designate catgut sizes, with a table of sizes of Red Cross Catgut compared with the ordinary gauge. (See also page 253).

"The Absorbable Suture," Series III page 181. A discussion of the suitability of animal sutures as compared with silk, silver, etc.

"Sutures in Intestinal Surgery," Series IV, page 28. Dr. Morgan Vance claims that the best suture material is catgut, the best stitch the Lembert, or some modification.

"Antiseptic Ligatures Again," Series IV, page 56. The introduction of catgut sterilization thermally seems to be supplanting the preparation of this material with chemical germicides. Plain sterilized catgut, however, is an excellent nidus for the development of germs which may reach it after its insertion in a wound. It has therefore been advised by certain operators to impregnate the catgut with a mild antiseptic.

"Suture of the Liver," Series IV, page 91. Coffey states that in suture of the liver it is necessary to employ a matress suture, which he describes.

"Iodized Catgut," Series V, page 40. The action of iodine brings about a gradual weakening of the strands, and final destruction of the gut, especially in the smaller sizes.

"The Choice of Suitable Material for Ligatures and Sutures," Series V, page 138. A historical review of the use of the ligature, with a discussion of the adaptability of animal tissue, silver and gold wire, silk, silk-wormgut, etc. The author concludes that catgut is one of the best substances available for sutures and ligatures, describing methods for its selection.

"What Is Catgut?" Series V, page 184. A description of catgut, its physical properties, its sizes, methods of preparation, and its anatomical structure, with microscopical illustrations.

"The Chemistry of Catgut," Series V, page 206. A chemical analysis of catgut, showing its constituents, makeup, that it is an organized collagen or gelatin, with a discussion of the effect of the reagents ordinarily used in sterilization, the probable effect of tissue fluids upon the constituents of the catgut strand, with an insight into its ultimate absorption within the tissue.

"Reliable Catgut," Series V, page 220. A review of the methods introduced by Johnson & Johnson for the preparation of catgut for surgery.

"Catgut—Its Absorption," Series V, page 256. A series of experiments conducted in the Scientific Department of Johnson & Johnson in order to ascertain whether the time of absorption of buried catgut could be foretold with any degree of accuracy.

"Causes Which Retard Absorption of Catgut Sutures," Series V, page 257. A discussion of the conditions of tissue which modify the rate of absorption of sterilized catgut sutures.

"Historical Notes on Ligatures," Series V, page 258.

"The Choice of Suture Material in the Peritoneum," Series V, page 258. Dr. Wetherill claims that catgut is an ideal suture: a second authority states that catgut is the best ligature in clean wounds, as well as in wounds where there is possible suppuration. Silk-wormgut is rarely if ever justified as a ligature material. Silk, kangaroo tendon, or chromic gut serves as tendon sutures.

"Catgut— Its Tensile Strength," Series V, page 272. A contribution from the Scientific Department of Johnson & Johnson, with a discussion of the causes which affect the tensile strength of the catgut, and the ordinary method of testing; the effects of chemical heat, etc., upon the tensile strength; a description of the apparatus used in these laboratories for ascertaining the strength of catgut, with a table of approximate breaking strain of surgical catgut.

"Suturing Wounds," Series V, page 286.

"Not made by Slaughter House Methods," Series V, page 287. A desciption of the new method of the preparation of surgical catgut by a series of processes of disinfection, beginning with the removal of the intestines from the animal.

"The Suture as a Factor in Primary Union," Series VI, pages 9 and 32. A discussion by James B. Morgan, M. D., Augusta, Ga., of the causes which at times retard primary union and the role of catgut therein, in which the author advances the belief that the principle drawback to primary union in aseptic wounds lies in faulty methods in the application of the suture rather than in the material used.

"Dr. Ashton's Method of Threading a Needle," Series VI, page 18. Illustrations of a convenient method of threading a needle, either with silk or catgut ligatures. "Catgut Suture in Fracture of the Patella," Series VI. page 82. Note by Riedl on the complications arising in certain old and recent fractures where catgut was employed.

"The Ideal Ligature," by A. D. Whiting, M. D., Philadelphia. Series VI page 98.

Discussion of experiments which led to the perfection of Zonas Catgut by impregnating the untwisted tissue with Silver Iodide. Series VI, page 94. (See also page 104 and 184).

"Ligature Sizes," Series VI, page 154. Description with illustrations of sizes for catgut and silk ligature material.

"Ten, Twenty and Thirty-day Catgut," Series VI, page 162. Explanation that these terms are in reality trade terms and designations and are not to be taken literally.

"Bacteriological Testing of Ligatures," Series VI, page 170. Contribution from the Scientific Department of Johnson & Johnson, detailing the methods employed in the bacteriological testing of catgut.

"Zonas Catgut," Series VI, page 194. Contribution by the Scientific Department of Johnson & Johnson, demonstrating that silver iodide will remain as long as any portion of the catgut itself remains unabsorbed.

"Tying Wet Catgut," Series VI, page 196. Contribution by the Scientific Department of Johnson & Johnson with illustrations showing the forms of knots which give the most satisfactory results with wet catgut.

"Our Way of Preparing Catgut," illustrating the methods of preparing catgut in the laboratories of Johnson & Johnson, together with the methods of bacteriological tests.

"Ten, Twenty and Thirty-day Catgut," Series VI, page 239. Contribution by the Scientific Department of Johnson & Johnson, explaining that these are trade terms and designations; they are misleading and in the opinion of the leading surgeons these terms should be abandoned as being inexact. Hardened catgut should be prepared to various degrees of hardness and designated by terms expressive thereof. For the result of experiments upon animals and the opinion of surgical authorities, see also page 245.

"Ligatures in Envelopes." Contribution from the Scientific Department of Johnson & Johnson, illustrating the methods of opening which prevent infection from outside sources.

"A Reserve Suture Outfit," Series VI, page 255. Suggested by Dr. Goethe Link, of a reserve suture outfit for abdominal operations.

"The Preparation of Catgut," Series VI, page 257. Note by Dr. Charles H. Christal, London, suggesting that catgut itself even though sterile may induce suppuration, with suggestions also of a remedy therefor.

"Catgut Absorption," Series VI, page 271. Abstracts from a paper by Dr. H. Cabot, of Boston, with suggestions as to the selection of sizes best suited for certain operations, care in tying, cutting, etc., with observations as to the phenomena of absorption.

## HARDENED CATGUT.

Several reports of the researches conducted by the scientific staff of Johnson & Johnson upon the subject of hardened or chromicized catgut have been recorded in Red Cross Notes and elsewhere. Some of these researches have been carried out through correspondence and otherwise, with several hundred leading surgeons of the United States. As a result the conclusion was to the effect that catgut as ordinarily hardened was most uncertain and unreliable and the authorities were unanimously of the opinion that the terms ten twenty and thirty day as applied to catgut hardened with chromic acid, or any other agent, should be discontinued.

The conclusion was reached that the requirements in a hardened catgut, and the most important ones to be considered, were that it should be thoroughly sterilized; that it should be approximately uniform in the time which it would resist absorption; that it was utterly impossible for an operator to say how long a specimen of catgut would remain unabsorbed in any given tissue; that a catgut which would remain unabsorbed for a period of about ten days is sufficient for most purposes. Where it is desired that the catgut shall remain unabsorbed longer, one which will resist absorption for a period about twice as long as ordinary catgut of the same size, will fulfill the needs.

It was also found that catgut prepared by immersion of the intestinal tissue before twisting in a hardening solution produced a strand uniformly hard and with an approximate definite time of absorption.

The result of the experiments, amounting to many hundred, was to the effect that we could produce two grades of hardened catgut as far as absorption is concerned. While it was impossible for the many reasons suggested by the experiments noted, and by those of the surgeons, to apply a definite time for the absorption of catgut, as, for instance, days or hours, it was shown that a catgut could be produced which in a given size in comparison with a plain catgut of the same size could be said to be of medium hardness, and another grade which could be said to be extra hard. In other words, if under identical conditions a No. 2 plain catgut remained intact or practically intact for one week a medium hard catgut of the same size and under the same conditions would remain unabsorbed for ten or twelve days, and in some instances longer. Catgut specially hardened, or, in other words, extra hard, of the same size and under the same conditions would remain unabsorbed for twenty days or more.

These grades were found to be sufficiently accurate for practical purposes, the testimony of the surgeons being to the effect that it is of no consequence whether a ligature keeps intact for ten to fifteen days provided it hold long enough to do the work which may be expected of it.

In accordance with these researches, and following the the almost unanimous suggestions of the most experienced surgeons, Johnson & Johnson and the J. Elwood Lee Co. have decided to abandon the designation "ten day," "twenty day" and "thirty day" as applied to catgut, and supply in their places catgut labelled "medium hard" and "extra hard," these terms signify the approximate degrees with which the strands will resist absorption. The catgut sent under these designations is treated with the hardening agents just before being twisted into strands; the strands are therefore more evenly hardened than by the ordinary method where the hardening agent is applied after the strand has been twisted, and it is confidently believed that this form of catgut will be found to be more uniform and more reliable than any which has heretofore been produced.

Catgut under the designations "medium hard" and "extra hard" is supplied in envelopes, tubes and other forms of packages.

A full report of the researches which led to the adoption of this method of hardening catgut is given in Red Cross Notes, Series VI, No. 10, and has also been issued in the form of a reprint, which will be sent upon request.

## ZONAS CATGUT.

This is a special form of catgut ligatures. During the process of twisting the catgut tissues, as described elsewhere in this issue, are impregnated and coated with a thoroughly precipitated silver iodide. Silver iodide is an insoluble combination of iodine and silver (insoluble in the ordinary sense as regards water). The value and desirability of this salt for impregnating catgut has been explained in various medical journals and in several issues of "Red Cross Notes." These reports have shown that silver iodide is a non-irritating antiseptic which inhibits the growth of bacteria, that is to say, it has a stimulating influence in the absorption of catgut, and that in the presence of this salt secondary infection around the catgut is prevented.

On the back cover of this issue appears a striking demonstration of this salt in preventing germ growth upon catgut even in infected wounds.

Experiments have shown that the gut has germicidal powers and not merely antiseptic qualities, and that in no instance was there any hindrance either aseptic or otherwise to healing by first intention.

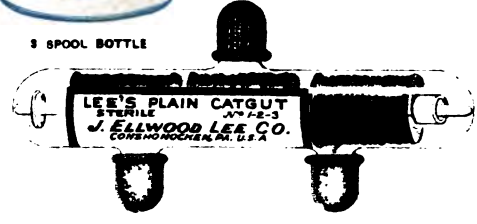
Zonas Catgut is absorbed in about the same time as regular plain catgut.

Zonas Catgut is supplied in envelopes only, in two sizes,—small size, twenty-eight inches in length, and the large size, ten feet coils. At the present time only Nos. 1, 2, 3, and 4, are prepared.

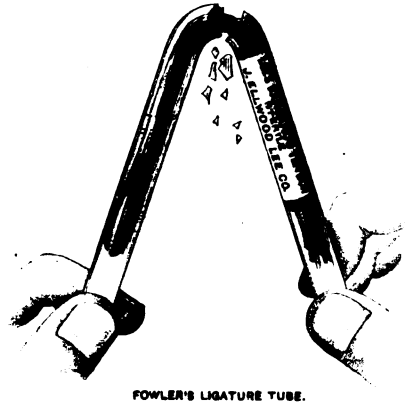
Zonas Catgut cannot be supplied with needles. See list elsewhere in this issue.

8 SPOOL BOTTLE

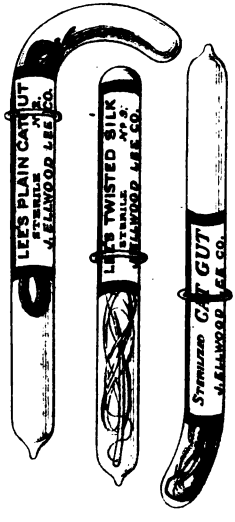
SMALL "BREAKABLE" TUBES.




THREE SPOOL TANK PACKAGE.

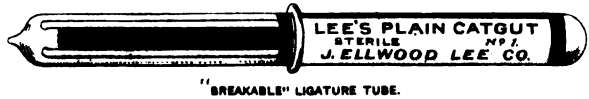



FOWLER'S LIGATURE TUBE.

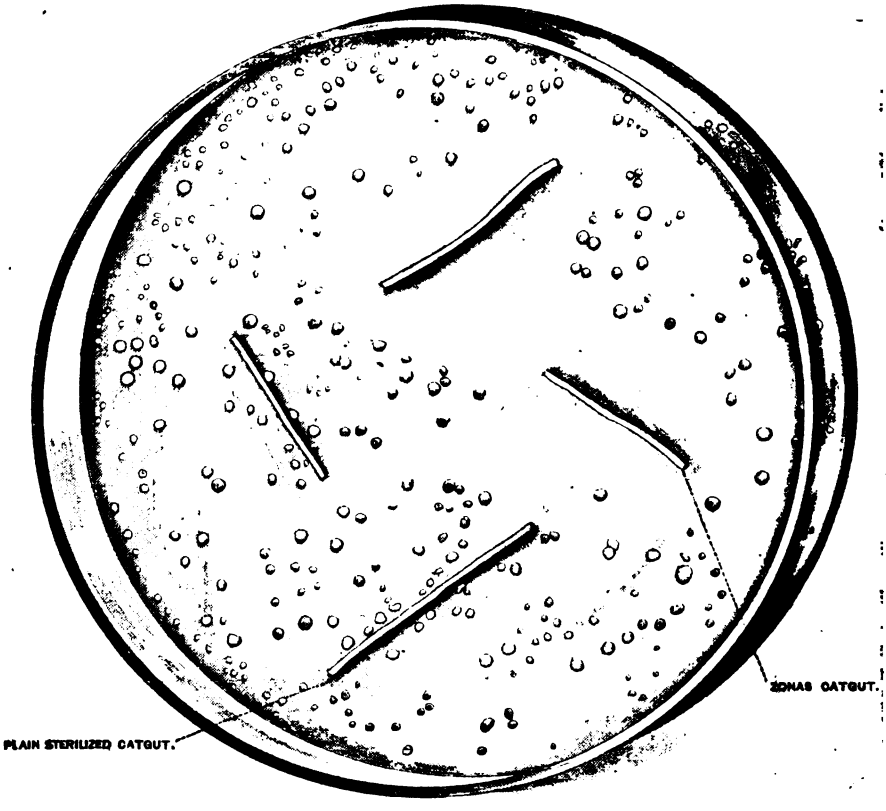



EMERGENCY TUBES WITH NEEDLES.

FOWLER TUBES.




"BREAKABLE" LIGATURE TUBE.




**Zonas Catgut is sterile gut strands or ribbons impregnated with silver iodide before twisting. The silver iodide prevents germ growth even in infected wounds. This is an illustration of a plate of nutrient agar jelly infected with staphylococcus pyogenes aureus. The colonies can be seen growing upon and around the strand of plain sterile catgut. The bright yellow strands are Zonas Catgut surrounded by a clear zone, showing that the organisms cannot grow in the presence of Zonas Catgut.**

28 INCH No. 2

ZONAS CATGUT

IN DOUBLE ENVELOPE GERM PROOF

This ligature is not only sterile, but is made of specially prepared catgut the strands of which, before twisting, are impregnated with silver iodide.

PATENT APPLIED FOR

Cleansed, Medicated, Twisted and Finished by

Johnson & Johnson

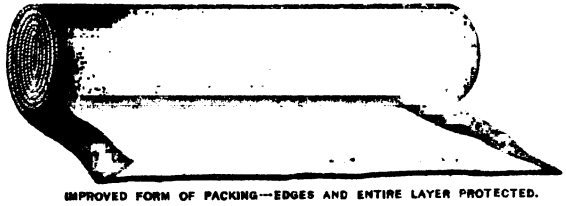
MANUF'G. CHEMISTS NEW BRUNSWICK, N.J. U.S.A.

# RED CROSS NOTES

SERIES VII NUMBER TWO

## RED CROSS COTTON NUMBER

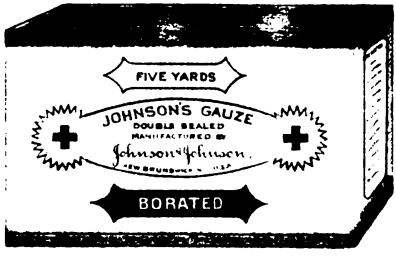
BOSTON MEDICAL LIBRARY



IMPROVED FORM OF PACKING—EDGES AND ENTIRE LAYER PROTECTED.

# PRODUCTS OF THE RED CROSS COTTON MILL

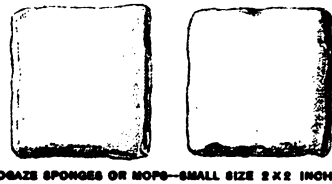
OUTER CONTAINER




5 YARDS COMPRESSED GAUZE.

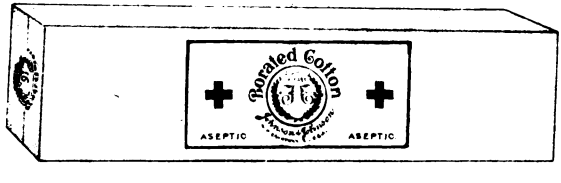
1 YARD COMPRESSED GAUZE.

MADE OF COTTON AND GAUZE—SEAMLESS



MOGAZE SPONGES OR MOPS—SMALL SIZE 2 X 2 INCHES, MEDIUM SIZE 4 X 4 INCHES, LARGE SIZE 6 X 6 INCHES

ASEPTIC TOWEL READY FOR USE



# RED CROSS NOTES

COPYRIGHT 1913 BY JOHNSON & JOHNSON

SERIES VII NEW BRUNSWICK, N. J. NUMBER TWO

RED CROSS NOTES
Published by JOHNSON & JOHNSON, New Brunswick, N. J., U. S. A.
Fred B. Kilmer, Editor
This publication is issued from the laboratories of the publishers with the intent to give, in brief, items of interest and reports of original research along the line of the particular branches of the art in which they labor.
Persons receiving *Red Cross Notes* will confer a favor by notifying the publishers of any inaccuracy in the address on the wrapper, and of any change of their address.

## A STUDY IN COTTON

While much is known about cotton as an article of commerce, less is known of absorbent cotton and surgical materials made of cotton than of any other articles common to the surgeon's armamentarium.

Considerable space has been given in various issues of *Red Cross Notes* to a study of absorbent fibre, which is known to modern surgery as absorbent cotton in its various forms. This data is the result of investigations made in the Johnson & Johnson laboratories. They made a scientific research which began in the field where cotton is grown, and followed the fibre to its ultimate application by the surgeon. These efforts were made to devise and apply processes that tend to advance the value of cotton for wound-dressing.

The basic principle in running these laboratories is that cotton for surgical purposes should be prepared by persons who have a knowledge of the requirements of modern surgery, coupled with the mechanical skill and scientific research necessary to carry out this basic principle.

The labors of Johnson & Johnson in the preparation of absorbent cotton, absorbent gauze and other materials made of cotton for surgical uses, have been of great value in the advancement of the surgical profession. Some of the advanced processes which they have devised and inaugurated are briefly sketched and illustrated in these pages.

It is believed that these workers are preparing perfect absorbent cotton preparations for surgical uses.

Southern cotton field, showing pickers at work. The picking is performed by hand-labor, the inner contents of the boll being removed with the containing seeds. The cotton is then transported to the gin, where the fibres are forcibly pulled from the seed. The product baled is the cotton of commerce.

This picture is reproduced from the famous "Cotton Field" picture first issued about twenty years ago by Johnson & Johnson.

## A COTTON FIBRE

If one can imagine a rubber tube about one inch in length, with one end closed and the tube twisted and doubled upon itself for more than one hundred times from end to end, he will gain an idea of a cylindrical, collapsible plant cell resembling a cotton fibre.

A cotton fibre, then, is a minute hair formed on and attached to the seed of the cotton plant. The hair is tubular, the outer sheet being pure cellulose, the tubular opening being filled with the plant juices. Torn from the seed the fibre collapses into a ribbon-like form.

In the cotton mills of Johnson & Johnson, the cotton fibres are cleansed from dirt and specks. To a certain extent they are straightened out and one by one they are combed and brushed, and each entwined around its neighbor, drawn parallel, weighed and measured.

When made into surgical gauze the fibres are twisted together and spun into a thread, and in turn woven into cloth. A yard of surgical gauze contains about 14,000,000 fibres of cotton.

In its natural state raw cotton fibre is coated, and the interior tube is filled with a sticky varnish-like substance. It is saturated through and through with a mixture of oils, waxes and jelly and is stained with coloring material. In this natural condition it will not absorb liquids or take up discharges from wounds; hence, to make such fibres into absorbent cotton these substances must be extracted, the fibre hydrolyzed and washed. In fact, the cotton must be flooded with water, until it comes out white and free from everything but its peculiar cellulose body.

There are more than 140,000,000 fibres in a pound of cotton and to make this into absorbent cotton or surgical gauze, each fibre must be, in a sense, individually treated and handled many times over.

In the Red Cross Cotton Mills these fibres pass through some forty operations. The last operation is a rolling and putting into packages, and the impregnation or permeation of each fibre with steam or germ-destroying gases; in other words—sterilization.

In preparing cotton for surgical uses, if one man did all the work, he would handle the same bit of cotton more than forty times; and the bale of cotton, from the day of entering the laboratory, would require ten days to make it ready for the surgeon. The loss of weight in passing from the raw condition to that of the finished absorbent cotton would be not far from forty per cent.

Cotton seed with fibres attached. In the ginning process the fibres are drawn from the seed.

Cotton though known to the ancients did not reach commercial supremacy until it came to be the great staple production of our Sunny South. It there received a popular personification and became an all important factor in the American Union under the title of "King Cotton."

The United States is the most important cotton growing country in the world.

Cotton Picking Machine recently introduced to replace hand labor.

## SELECTING THE RAW MATERIAL

In the manufacture of Red Cross Cotton and Gauze the selection and examination of the raw cotton fibre becomes a matter of the greatest importance.

It is the practice in the Johnson & Johnson laboratories to contract for the cotton at the opening of the cotton season, a part of the specifications being that the cotton should be of good body, clean and free from mud, leaf, sand and dirt, and reach a certain standard as to staple, elasticity, etc.

Every bale of cotton as it arrives at the warehouse is weighed, and to it is assigned a number, together with the bale marks, weight, shipper's number and number of contract to which it applies, a sample is taken from each bale and

Examiners' samples of cotton. Each cylinder contains a sample taken from a separate bale, and is tagged with the bale marks.

critically examined, the samples being placed in a paper cylinder for this purpose to which is attached a duplicate of the marking upon the bale. These samples are then examined by experts as to cleanliness, length of fibre, strength of fibre, amount of ripe, half ripe and unripe fibre, color, etc. The standard length of fibre acceptable to Johnson & Johnson is 1 1-16 inch, and the color what is known as "good." If a sample is found up to the grade desired and it is approved the bale is marked "accepted" and if not the bale is marked "rejected."

Elsewhere is illustrated fibres which are acceptable together with several samples illustrating those which have been rejected. Spread out on a black surface as here shown it is not difficult for a novice to see the difference.

## RED CROSS COTTON MILLS

The buildings for the manufacture of Red Cross Cotton and Gauze were erected in 1900. This plant is a unique manufactory.

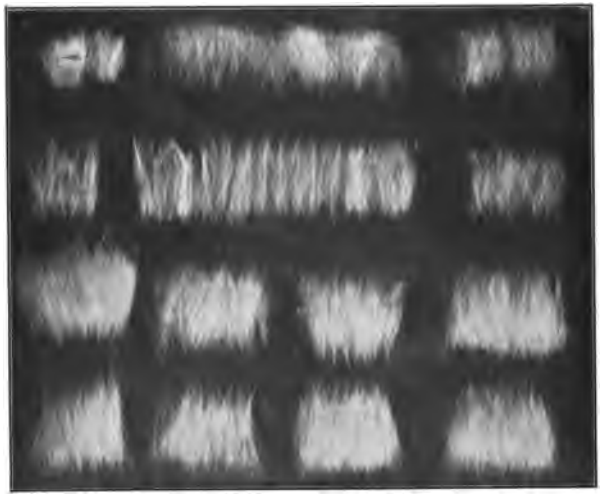
Previous to the erection of these mills, Johnson & Johnson purchased finished gauze and other materials and then packed them for surgical uses.

Now, since 1900, the Red Cross Cotton Mills turn out gauze cloth that is manufactured especially for surgical purposes. Johnson & Johnson combine the manufacture of surgical dressings with a cotton cloth mill.

The advantage of manufacturing as well as preparing cloth for surgical dressings is not only an advantage but a necessity in order to obtain absolute cleanliness. Mills that turn out commercial cotton cloth manufacture from the commercial standpoint only—producing the greatest amount of goods at the least outlay of capital. Surgical cleanliness is not obtained or even understood in such mills. General conditions are unpleasant and no attention is paid to the health of the operatives.

The Red Cross Cotton Mills, however, stand in strong contrast. Few buildings, erected for any purpose whatever, are better lighted and ventilated. No other cotton cloth factory is comparable to this, say the visitors who are acquainted with the largest mills of England, New England and the South. The Red Cross factories are striking examples of American progress.

The Red Cross Cotton Mills alone have been able to meet the present demands for better surgical goods, more reliable goods, more cleanly goods. And this concern alone has made the manufacture of surgical dressings a separate and distinct industry. Just as the invention of cloth-making machines began a new era in that industry, so the erection of the Red Cross Cotton Mills marked a new era in the production of gauze dressings for surgery.



Fibres of cotton as prepared for examination. The two upper rows represent bales which were rejected on account of length and character of staple.

Certain necessary qualities in cotton fibre are (1) length of fibre, (2) smallness or fineness in diameter, (3) evenness and smoothness, (4) elasticity, (5) strength, (6) color, (7) hollowness, or tube-like construction, (8) natural twist, and (9) corrugated edges.

Three hundred bales of cotton rejected as not good enough for making into Red Cross Cotton products. The bales shown in this photograph could be made into absorbent cotton, and such absorbent cotton would be salable; in fact, it is our belief that these rejected bales are of a much higher grade than that used by many so-called makers of absorbent cotton.

In the left-hand corner is a typical bale of American cotton. Such bales contain from 350 to 500 pounds each.

## THE CHEMISTRY OF MAKING COTTON

The processes employed in rendering cotton fibres absorbent may be considered as very simple or very intricate, according to the point of view. They are popularly termed bleaching methods, but they differ quite essentially from ordinary bleaching.

Cotton fibre can be bleached without being rendered absorbent, and it can be made absorbent without being bleached. On the continent cotton fibres are made absorbent and then prepared for surgical uses by the simple extraction of fatty matter with solvents, such as naphtha, carbon bisulphide, or by an alkaline treatment without bleaching. The resulting product will absorb water, but it is not white. Bleached cotton cloth and bleached cotton fibres which are not absorbent are well-known products.

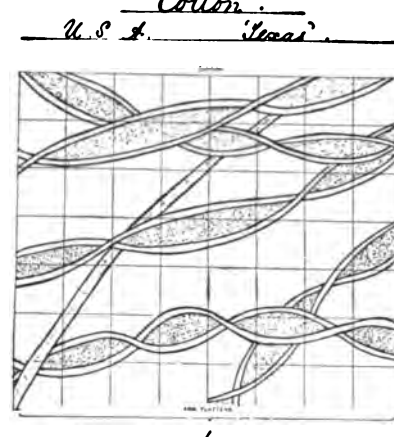
The chemical processes followed in the Red Cross Laboratories may be summarized as follows:

1. Cotton fibres mechanically cleansed of dirt and other impurities, carded; in other words, opened out and separated, are packed in boilers and washed with water.

2. Alkaline hydrolysis. In this process the non-cellulose constituents of the fibre (waxes, fats, oils, pectones, etc.) are hydrolized. In this treatment a portion of the cellulose is dissolved by being saponified. In certain experiments conducted by me the loss in weight in this process averaged from four to nine per cent. The products of the alkaline treatment are not easily removed from the fibre.

3. Extraction of alkaline hydrolyzed products. This is a long and tedious process. Indeed, at the end of the process the fibre structure is not entirely free from its content. Their final removal takes place subsequently.

4. Oxidation. This is the removal of coloring matter and by-products of the alkaline treatment formed in the preceding stages. The hypochlorites of lime and soda have both been used, the former is employed exclusively in the cheaper grades of cotton and cloth; the soda produces a softer, whiter and more elastic product. The oxidation in these processes is carried to the utmost limits that the fibre will allow. The requirement is not only to attack the color but to penetrate every molecule and to break




Cotton fibres magnified 200 diameters showing the characteristic twist and the ribbon form. Cotton fibre is a hollow tube.

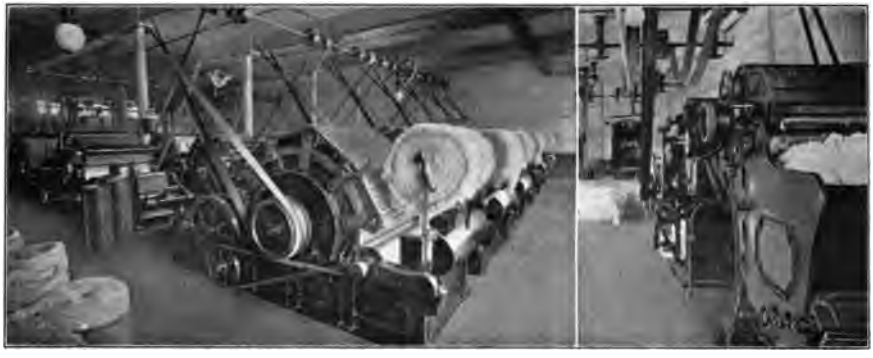
up every existing combination, even those remaining from the alkaline hydrolysis. The way is thus prepared for the removal in subsequent operations of everything except true cellulose. This process is a most important and delicate one. The cellulose itself is liable to be attacked and oxidized, and that the cellulose is oxidized is shown by the great rapidity with which these fibres take up basic coal tar dyes. The fibre is rendered more or less tender and gives the usual reactions for oxy-cellulose.

5. Hydro-extraction, neutralization and removal of oxidizing chemicals. In this process, unless the products are most thoroughly washed away they are liable to be carried over into subsequent processes. Indeed, their thorough removal requires a special and separate treatment.

The final product is hollow fibres of chemically pure cellulose—Red Cross Cotton.

## WHAT THE TERMS MEAN

The terms "absorbent cotton" and "absorbent gauze" have a much wider meaning than they at first seem to imply. The preparation of surgical gauze from the cotton field to the finished product, even extending to the time when it reaches the patient, requires in every step the same skill and accuracy imposed upon the preparation of any medicinal agent.



Opening, cleaning and picking cotton. Raw cotton entering machines like those on the right is opened out and picked apart, leaves and other impurities are blown out by drafts of air. The fibres are gathered into a blanket or sheet as shown at the left of the picture, passing in this way through a series of mechanical cleansing processes.

Large pipes pass from room to room, and through these conduits the cotton fibres are blown from end to end, from floor to floor, and from building to building. While on their way every bit of short flying fibre, dirt, seed, sand, leaf, shuck, and whatnot, is picked up and blown away, so there is no dust or litter to be seen.

Hydrolytic laboratory where cotton and gauze are made absorbent. The cotton enters the laboratory by a current of air. It is packed in vats or tiers, and the tiers are subjected to the action of the extracting chemicals. By this process the fibre is freed from wax, resinous and coloring matters. After the final washing in pure water the fibre, or the gauze, is passed to the drier by mechanical conveyances.

## FROM THE COTTON TO THE WOUND

This picture graphically portrays the operation of gauze making and sterilization, which typifies the work of the Red Cross Laboratories. In these laboratories cotton in the bale, as it comes from the field, is cleansed, carded, spun into threads, woven into gauze, made absorbent (medicated when necessary) packed in containers, sterilized, and made ready for the operating rooms. All the transformations of the raw cotton to the finished dressing are carried out under the conditions that meet the requirements of modern surgical science. Here, in part, is the strong line, the difference between the products of the Red Cross Laboratories and those which emanate from the ordinary cotton mills.

**In one case the material comes from a source in which the needs of surgery are ignored or not understood; in the other case, the material comes from the raw material to the finished product where all the work is done in a surgical laboratory.**

**This illustration indicates the progress of loose cotton fibre towards the thread in weaving Red Cross Gauze. The loosely finished rope or "sliver" of cotton shown at the left of the picture shows the finished form in which it is received from the carding and combing process. This "sliver" is reduced to a thread by repeated stretching and twisting, which constitutes the spinning process. The spun threads are then woven into cloth.**

## RED CROSS COTTON

The Red Cross is the trade-mark of Johnson & Johnson and it appears upon the label of all of their goods and is a guarantee of the genuineness of the products. They also guarantee the blue carton and the blue tissue paper between the layers of cotton. But other makers of absorbent cotton, presumably to make their cotton appear to be as good as Johnson & Johnson's, roll their cotton in tissue and put it in a blue carton and, worse still, print a label bearing a red star, a red square, a red wheel or a red something that is intended to look like the genuine Red Cross Cotton. All this is flattering to the originators. It is, however, an unfair means of gaining trade. More than all, it is often very disappointing to the surgeon.

Cotton carding. Raw cotton on its way to become absorbent, or to be made into gauze, is carded by passing through machines consisting of cylinders covered with teeth which act as combs. They handle the individual fibres, laying them straight and parallel. The cotton is woven into sheets of spider web like structure. Absorbent cotton is carded after being extracted.

In the Red Cross Cotton Mills the machines which make up cotton fibre are of all sorts. Some handle it in a mass—dirt and all, some work in such detail as to literally take up the single fibres one by one, the fibres are brushed and cleaned, pulled out side by side, evened up, untwisted into a fluffy fleecy rope, and finally by continual twisting and pulling this rope is made to become a thread and the weaving looms complete the transformation of the fibre into finished cloth.

Gauze making. The beating and cleansing of cotton for the manufacture of surgical gauze is quite like that for the production of absorbent cotton, the essential difference being that the fine, fleecy sheet as it emerges from the carding machine, when intended for gauze, is coiled into a sort of loose rope called a "sliver." This "sliver" forms the first stage of the thread.

# SPINNING YARN FOR GAUZE

Spinning is the reducing by gradual stages of the rope or fibre turned out by the carding machines. This reduction is accomplished by stretching out or attenuating, while at the same time the rope is made finer and stronger by twisting.

There are four different classes of machines through which the thread must pass, and along with the attenuation at every stage the twisting is also going on. Thus a transformation is made of a rough rope an inch in diameter into a tightly spun fine thread.

A pound of cotton will spin about twenty miles of such thread. The spun threads are in turn passed to looms to be interlaced and interlocked into gauze cloth.

The illustrations on this page show the spinning rooms in the Red Cross Cotton Mills.

Weaving gauze. The third stage of cloth making is the weaving itself. Weaving is an interlacing of threads generally at right angles to form a texture or cloth. In the old hand process the weaver lifts up every alternate thread of the lengthwise set, known as the "warp," passes it under the shuttle containing the transverse thread, called the "weft" or "woof." A familiar household definition of weaving is the darning of stockings; the needle takes the place of the shuttle, and carries the transverse or weft threads over and under the warp threads. The illustration shows one of the weaving rooms in the Red Cross Cotton Mills.

The gauze, after being woven is sewn into an endless rope that is carried automatically to the hydrolytic laboratory, where, passing over rollers, it is transferred from solution to solution for extraction and rendering absorbent. After a final washing in pure water it is carried automatically to a dryer, never being touched by hand.

Packaging room for absorbent cotton and gauze. The dressing after being packed in this room passes to the sterilizing rooms.

## PURE WATER FOR RED CROSS COTTON

The character and quality of the water used in the preparation of cotton fibre for surgical uses is of great importance. For the purpose of making Red Cross Absorbent Cotton and Gauze this is attained by means of a filter plant of the most modern construction, the principle involved being sedimentation after treatment with a coagulant (aluminum sulphate). The filter beds are of the sand and gravel type, cleaned by means of compressed air blown through them from below, followed by washing with filtered water.

Tanks of purified water for Red Cross Cotton Mills

Routine tests are made for turbidity, temporary hardness (carbonates), color and freedom from aluminum sulphate.

Periodical bacteriological examinations are made including the fermentation and lactose litmus tests.

It may be observed that a very hard water is objectionable for use in the preparation of a high grade of absorbent cotton, not only on account of the reaction of the chemicals used, but from the fact that the fibres being absorbent hold so much of the water that upon drying a portion of the lime and salts would remain.

Again it is essential that the water should be free from color and from organic matter. This requirement will be apparent when it is considered that each fibre of absorbent cotton is a capillary porous cell of absorbent cellulose, and that each individual cell constitutes a filter. For this reason only the purest and most colorless water must be used; otherwise the cotton would filter out sedimentary matter from the water and coloring matter. When impure water is passed through a considerable depth of cotton, the water is to a degree purified and the cotton in turn rendered unfit for use.

## NEW ERA DRESSINGS

The Red Cross Laboratories are not only the largest surgical dressing factories in the world, but they surpass all others in their system of producing as a unit by strictly up-to-date methods. They are the first factories in the world to take raw cotton and put it through all the processes by which it is transformed into finished surgical dressings. Other surgical suppliers are handlers rather than manufacturers of surgical dressings, because they depend upon commercial cotton mills for their gauze.

Buyers and users of surgical dressings may well prefer the goods manufactured from the beginning by a firm that keeps its manufacturing plant as clean as a hospital ward. For the surgeon and the consumer, reliable goods are of vital importance.

---

Physicians are invited to correspond with Johnson & Johnson respecting any of their products, or upon topics allied to their line of manufacture. Descriptive literature and samples will be furnished on request.

Operations upon raw cotton fibre as carried out in the Red Cross Cotton Mills of Johnson & Johnson in the preparation of absorbent cotton:

### Mechanical Operations

1. Sampling and inspection to establish grade and reject inferior qualities.
2. Mixing—Blending of different varieties of raw cotton, in order to secure economical production, uniform quality and color, and an even thread. Mixing is, in a measure, imperatively necessary, in order to neutralize the irregularities of growth found more or less in all cottons.
3. Opening, in which process the matted masses of cotton fibre are opened out and the heavy impurities, such as sand, shell, leaf, etc., are removed.
4. Beating, blowing, lapping or "scutching" are a continuation of the process of opening, at the end of which the cotton is rolled in an even sheet or lap. The cotton at this stage has been opened up and restored to the same condition as it was when first gathered at the plantation, minus seed, sand, leaf, dust and other impurities.
5. Carding—The fibres are, in this process, further opened out and individually separated; laid approximately parallel; very fine impurities are removed together with short and unripe fibres. As the cotton leaves the card, the fibres, if to be made into absorbent cotton, are gathered together in a web or fleece; if to be made into surgical gauze, the fibres are gathered into a rope a little less than an inch in diameter, called a "sliver."

## ABSORBENT COTTON FROM START TO FINISH

Cotton fibre, after treatment by the processes outlined above, when made into absorbent cotton, passes through a series of chemical and mechanical operations, the principal ones being here noted.

### Chemical Processes

1. The cotton fibre, mechanically cleaned, is packed in boilers and washed with water, preparatory to chemical treatment.
2. Alkaline Hydrolysis.—In this process the non-cellulose constituents of the fibre, wax, fat oils, pectose, etc., are hydrolized to products soluble in alkaline liquids.
3. Extraction of alkali and hydrolized products.
4. Oxidation for removal of residues and by-products of the alkaline treatment, and oxidation of the coloring matter of the raw fibres (the first stage of bleaching).
5. Extraction of oxidizing chemicals.
6. Acid Oxidation.—A completion of the oxidization and bleaching action of the foregoing process.
7. Extraction of acid and acid products.
8. Second alkaline hydrolysis.
9. Extraction of alkaline products.
10. Second acid oxidization (completion of bleaching).
11. Neutralization of chemicals and removal of neutralization salts.
12. Hydro extraction.

### Mechanical Processes

1. Opening.—The fibre at this point is bleached and absorbent, but somewhat matted and tangled and must be opened for subsequent operations.
2. Drying (temperature 220).
3. Lapping.—Gathered into sheets preparatory to carding.
4. Carding.—Fibres individually separated and formed into thin films, the films gathered into layers.
5. Extraction of oxidizing chemicals.
6. Cutting.—Rolls cut into sizes,—pound, half-pound, quarter-pound, ounce, etc.
7. Packing into cartons.
8. Sterilization. 9. Bacteriological tests.

# ART TO FINISH

## SURGICAL GAUZE FROM START TO FINISH

Cotton fibre, after treatment by the processes outlined on the opposite page, if made into surgical gauze, passes through a series of mechanical and chemical operations, the principal ones of which are here noted:

1. "Combing."—A literal combing to obtain uniformity in the length of the fibres, in which all those shorter than the required standard are combed away and rejected.

2. "Drawing."—In this operation several slivers are combined and attenuated to the dimensions of one of the component parts; the object is to render the new sliver more uniform in thickness, and to place the fibres more perfectly in parallel order.

3. "Slubbing."—This is a process by which a further combination of the slivers is affected. The drawing or attenuation of the strand is now carried so far that it becomes necessary to twist it slightly in order to preserve its cohesion and rounded form.

4. "Intermediate" or "Second Slubbing."—A repetition of the above; object, to produce even and clean yarn.

5. "Roving."—A continuation of the preceding, to still further attenuate the sliver. At this point the rope or sliver receives additional twist to enable it to bear the slight strain necessary to draw it from the "spool" without the formation of uneven places.

6. "Spinning."—The sliver is here attenuated to the required fineness and is given the twist by which the thread is completely formed.

7. "Doubling."—The combining of two or more threads to form a single cord for the production of varieties of yarn which are used for different purposes.

### Weaving Operations

The transformation of the yarn, after leaving the spinning process, into cloth. These processes may be considered as five: a. Winding. b. Spinning. c. Sizing. d. Drawing or twisting the warp. e. Weaving or interlacing the threads so as to make a texture.

### Operations on the Woven Cloth

The woven gauze cloth is made of raw fibre; is therefore non-absorbent, and must be made absorptive. This requires operations similar to those for rendering cotton absorbent. The gauze cloth is carried through these operations in one continuous piece of fifty thousand yards, passing from solution to solution automatically, at the rate of about 200 yards per minute.

1. "Gray Washing."
2. "Bowking."—Decomposition of fatty, resinous and waxy matters in the threads preparatory to removal by subsequent operations.
3. Washing.
4. Alkaline hydrolysis.
5. Extraction of alkali and hydrolized products.
6. Alkaline oxidization (first stage of bleaching).
7. Extraction of oxidizing chemicals.
8. Acid oxidization.
9. Second alkaline hydrolysis.
10. Extraction of alkaline products.
11. Second acid oxidization (completion of bleaching).
12. Neutralization of chemicals and removal of neutralization salts.
13. Opening.—The gauze cloth at this point is white and absorbent, but folded and twisted and must be opened to full width for the next operation.
14. Tentering (stretching, drying, calendering).
15. Rolling (folding automatically). If for antiseptic gauze, it is impregnated with the antiseptic solutions at this point.
16. Packed into containers.
17. Sterilization (steam vacuum).
18. Bacteriological tests.

## THE MANUFACTURE OF SURGICAL DRESSINGS

The following article originally appeared as an editorial in the *Pharmaceutical Era.* The ideas expressed are so trite that the editorial is here reproduced:

Surgical cleanliness is a very different thing from ordinary cleanliness, and this surgical cleanliness must characterize every step in treatment, and all the materials and instruments used; sterilization is the watch cry. If success then depends upon this extreme cleanliness, the question naturally arises how it is to be best attained. The surgeon will secure the proper surroundings for the patient, he will see that the field of operation be suitably prepared, that his instruments and the hands of himself and assistants be in the proper condition. All these things are attended to at the time, but the dressings to be applied, the bandages, gauzes, sponges, etc., present an entirely different problem. To whom should the preparation of these be entrusted—to the physician, the pharmacist or the manufacturer? This question has been raised by surgical authorities in recent discussions. We believe that as a rule it is inexpedient and inadvisable to lay this duty upon either the doctor or druggist, but that it is best confined to the manufacturer, who alone can give that attention and care which are imperatively called for.

The doctor's office is not the proper place to prepare aseptic dressings. His furniture is in constant contact with the clothing and persons of patients carrying infection of every sort. The carpets are filled with pest laden dust. If we look into his laboratory we often find a worse condition, tables. shelves, books and apparatus spattered with debris from urinal examinations, pus from foul sores, blood stains, etc. Before he attempts to prepare aseptic dressings, his premises should be cleansed and disinfected.

When dressings are prepared by the pharmacist, the work is generally performed in the drug store back room. This place comes far short of the conditions known as surgical cleanliness. The chemically clean graduate is still unclean in the eye of the surgeon. Counters covered with vegetable and animal drugs of all sorts and kinds are not suitable places upon which to place absorbent gauze. Street and store dust, spatterings of syrups, extracts, oils and decoctions create a favorable lodging and breeding place for organic life. These are not wanted in surgical dressings. The pharmacist, though ordinarily clean in person and habits, familiar with soap and water, is far from aseptic. Like the physician, he is constantly in contact with infection through the person of his patrons. There must be a radical change of environment before the pharmacist can attain success in aseptic technique, though he may perhaps rightfully claim conditions and facilities that are above those of the ordinary physician.

The facilities of the manufacturer, whose whole organization is adapted to the production of surgical dressings, are certainly more perfect than those of the surgeon, to whom such work is incidental. The environment of a room from which pathogenic organisms and septic matter are entirely excluded, is superior to that obtained in the hospital or in the doctor's office. The room in which no work is undertaken except the handling of aseptic material, will certainly be nearer surgically clean than one to which infection has constant access. Persons whose only calling is that of preparing surgical material, who have been schooled in the principles underlying the infection and disinfection of dressings, are probably more competent to handle dressings than the doctor's student or his attendants, to whom such work is necessarily relegated. In this work, as in many other instances, properly constituted apparatus is more efficient, more cleanly and more perfect than hard work.

To the manufacturer and dispensing pharmacist is due the credit of having made possible the universal application of the principles of modern surgery. They have supplied to the practitioner in the most remote regions, appliances as perfect as those used in the greater hospital centers. They have placed in the hands of the practitioner appliances that fulfill every requirement of the advanced art of surgery.

The preparation, selling and dispensing of medicinal and surgical supplies to the doctor, to the surgeon, and to the public belongs to pharmacy. Their application is the province of the practitioner of medicine and surgery.

## JOHNSON & JOHNSON AND ABSORBENT COTTON

The discoveries of Lister may be said to have revolutionized surgery. While the methods now pursued differ greatly in details to those pursued by Lister, still the fundamental principles are the same. As Lister's ideas came to be understood, experiments began with various sorts of materials as dressings.

Lister first used non-absorbent cotton and non-absorbent gauze, his early trials being about the year 1880. It was soon found that what was needed was a purified cotton, and the introduction of the substance known as absorbent cotton wool proved to be the cause of marked advances in surgical dressing.

Inseparably connected with all these advances were the efforts of Johnson & Johnson. They entered into business in 1886, just at the time when cotton was gaining general notice by the surgeon, and they gained prominence at the start through a notable improvement by them in the method of putting up absorbent cotton. This improvement was the rolling of cotton in layers with alternate wrappings of tissue paper. Instead of wads the surgeon was given a handy roll from which he could easily take the amount needed. The effect of this improvement was incalculably great, and may be aptly illustrated by the fact that in 1886 the absorbent cotton used in surgery was possibly a little over two hundred pounds; the consumption raised rapidly until in 1898, and at the time of the Spanish War, it was estimated at three million pounds. At the present time the consumption is estimated at somewhere from six to ten million pounds.

The ascendency gained by Johnson & Johnson at the start has never been lost. They have ever been foremost among the makers of surgical dressings. The value of the services of Johnson & Johnson to surgery in respect to absorbent cotton and dressings made of cotton cannot be over-estimated. The educative value of their first booklet "Modern Methods of Antiseptic Wound Treatment," published in 1887, was alone sufficient to earn for them the lasting gratitude of the world of surgery.

Their growth since that time has been steady. In twenty-five years, from a very small beginning, there has arisen an establishment which is a fair sized industrial village.

---

## COTTON

Henry W. Grady once said of cotton: "The world waits in attendance upon its growth. The shower that falls whisperingly on its leaves is heard around the world. The sun that shines upon it is tempered by the prayers of all the people. The frost that chills it and the dew that descends from the skies are noted, and the trespass of a little worm on its green leaf is more to Great Britain than the advance of the Russian army upon her Asiatic outposts. Its fibre is current in every bank."

**Cotton warehouse where raw cotton is received, sampled. and tested before transferring to the laboratory**

## STANDARD SURGICAL DRESSINGS

The work of Johnson & Johnson in raising the standard of surgical dressings and thus contributing to the advance of the art of surgery, is well exemplified in the many improvements which they have made in the preparation of surgical dressings, and especially those into which cotton fibre enters as a component part.

The highest type of surgical dressing is illustrated by the many forms of surgical gauze, Linton moist gauze, absorbent cotton and numerous other dressings which have been devised, improved and perfected through the efforts of Johnson & Johnson.

Among the many improvements made by them, the following may be worthy of special mention:

The substitution of automatic machinery for hand work in all operations connected with the preparation of material for wound-dressing—

The adoption of sterilized and aseptible apparatus in the place of manual manipulation—

The changing of intermittent methods of preparing surgical material to that of continuous processes, whereby dressings are kept under aseptic conditions and subjected to repeated sterilization during the entire time of their preparation—

The substitution of operatives especially trained in surgical cleanliness for unskilled labor—

The application of the principles, rules and systems of aseptic technique in the preparation of surgical material in the laboratory—

The perfection of processes whereby, in the preparation of surgical material, dirt, dust and bacteria are removed, excluded and destroyed—

The introduction of methods for packing and hermetically sealing surgical dressing material after being freed from bacteria, in a manner that would admit of their being handled in commerce and dispensed without risk or contamination—

The perfection of packages for surgical dressing material that could be opened by the surgeon and a portion of the dressing removed without contamination—

The production of antiseptic and aseptic sterilized dressings, which were distributable through commerce—

The adoption of steam sterilization, vacuum pressure sterilization and formaldehyd vapor sterilization for surgical dressings.

This work in its entirety produced a new era in the manufacture of surgical dressings, in the course of which buildings and rooms were built, fitted up and solely adapted to the purpose of producing surgical material therein.

The Red Cross Cotton Mills, consisting of a series of laboratories, are the largest surgical dressing factories in the world.

It is probable that no other manufacturer has contributed a share such as Johnson & Johnson's to the progressive evolution of the last twenty-five years. They have transformed the whole character of dressings supplied for surgical use. By a most thorough observance of every rule of scientific surgery, by close attention to every mechanical improvement they have been able to lead the way to the preparation of surgical dressings which are universally acknowledged by the leaders of the professions, to have, in the last two decades, revolutionized the art of surgery.

A few of the standard products of Johnson & Johnson are illustrated on the cover pages of this issue. These few are truly typical and representative of surgical dressings for which Johnson & Johnson have made the standard, raised the standard, and will endeavor to maintain the standard.

---

## THE LOOM

The history of the evolution of the loom from a mechanical viewpoint is unsurpassed by any other stories of patience and achievement. Unless it is the invention of the printing press, nothing has given rise to more important results than the invention of the spinning and weaving machinery. This machinery has made the cheapest and best materials that are provided by nature available to the ordinary uses of mankind.

The period of spinning and weaving machinery introduction in England is the boundary line of industrial conditions between the old type and the modern type of manufacturing.

# PACKING THE RED CROSS DRESSINGS

The illustrations on this page show two of the aseptic rooms. The walls of these rooms are of white enamel and plate glass. The tables are made of glass and enameled iron.

The departments where this is accomplished are probably more than any other single part distinctive of the Red Cross Cotton Mills. Every visitor, if he carries away no other impression, is struck with the cleanliness of the packing room and its operatives. Here he realizes that he is viewing no mere cotton mill; here no care is considered too great. All operatives are selected, and are versed in the fundamental principles of surgical cleanliness, and are bound under the most careful restrictions as to personal cleanliness. On coming into the mill street clothing is changed for washable uniforms which are kept scrupulously clean. Printed rules are provided which cover all the main points of cleanliness and by these rules all employees are strictly bound.

Finally, after the packing, no matter what care is taken in the preparation, the goods are subjected to the one final and vital process, viz: sterilization.

## CLEANLINESS—CONTENTMENT

The upper illustration on this page shows the lavatory arrangement throughout the laboratory. These insure cleanliness of the operators.

The lower illustration shows a portion of the kitchen where lunches are prepared. In constructing and operating these laboratories the management have carried out the idea that the surest way to success is through healthy, happy and contented operatives, and for this purpose they have provided large, well-lighted rooms, warm in winter and cool in summer; free from dust so common to ordinary factories. This, together with contented and happy operatives, always insures the perfection of their products.

## LINTON MOIST GAUZE

### A Quarter of a Century of Successful Use

The universal application of the principles of modern surgery, it is conceded, is due to Linton Moist Dressings. Probably no other single article has been an equally important factor with this type of dressing in the progress of surgery in the last twenty years. To-day in every land, in every clime and in every corner of the globe, Linton Moist Dressings are sold, commended and used.

Certain facts in the history of Linton Moist Dressings are remarkable in connection with the rapid evolution of surgical methods during the same number of years.

From the time of their first manufacture the sale of Linton Moist Gauze has increased. Many most successful surgeons have used the dressings constantly all these years. In all the modifications of surgical technique, in all the attempts to abandon chemical antiseptics, and in all the adoption of asepsis to the exclusion of antisepsis, Linton Moist Dressings have held their place. The application of antiseptic methods, except in large hospitals under exceptional conditions, was considered impracticable when the manufacture of these dressings was first conceived. From the first use of these dressings it became possible to apply the principles of antiseptic surgery anywhere and everywhere. More than this, these dressings have kept pace with the continuous progress of the art of surgery. Antisepsis has developed into its highest form—asepsis; or rather antisepsis has made asepsis possible.

Keeping pace with surgical evolution, Linton Moist Dressings have become aseptic. This was accomplished when the original forms of Linton Dressings were made into Sterilized Antiseptic Dressings. The bringing of this about has necessitated the erection and equipment of laboratories for the sole purpose of making surgically clean dressings. The training of operatives in asepsis, the subjection of the finished dressings in their containers to steam sterilization, and sealing them during the sterilization process followed as natural items in manufacture. The package of dressing and the method of packing it have kept pace with all of these changes.

Linton Moist Gauze Dressings are packed in glass jars of a convenient, usable form, hermetically sealed. A portion of the dressing can be removed without contaminating the remainder. A quite recent innovation has been the adoption of physiological salt solution in place of water for moistening the dressings.

Altogether, Linton Moist Gauze Dressings possess a remarkable history of nearly twenty-five years of success. The underlying principles upon which these dressings were first made, still remain, in the face of the drastic changes of surgical procedure. They have been modified and amplified to meet the advancing needs of surgery, until to-day they stand firmly entrenched as the most perfect antiseptic dressings yet produced.

---

## COMMERCIAL SIDE OF THE RED CROSS COTTON MILLS

The laboratories in the Red Cross Cotton Mills are equipped with apparatus which handles a great amount of material and handles it more economically and successfully than has heretofore been possible. There results a saving in the cost of the labor of handling, which means more than a lowering of price. The ultimate result is a higher grade article for the same price.

Starting with raw cotton, improved methods are used for removing dirt, leaves, sand, short and dead fibres. And improved methods of cleansing are used to prevent the cutting, tearing and breaking of delicate fibres. Improved methods of carding and spinning reduce the loss of strength, loss of elasticity and other vital and important properties of the cotton.

Examination and tests show that the absorbent cotton fibres and the fibres which make up the individual threads of surgical gauze prepared under these methods, have qualities of elasticity, absorbency, strength and working value, from a surgical standpoint, from two to ten times greater than cotton fibres produced by any other method. Hence comparison of the products of this mill with those of other mills cannot be made by counting the threads, by examination as to the property of sinking in water, by any other superficial method, nor by the price.

## RED CROSS STANDARD COTTON

The difference between the absorbent cotton used by surgeons twenty-five years ago—a yellow, dirty, half absorbent wad—and the perfect product of to-day is hard to realize. The so-called absorbent cotton of that time was of little use to a surgeon; to-day it would be considered as utterly valueless. If absorbent cotton had remained exactly where it was when Johnson & Johnson began its production, it would never have become an article of importance, either in surgery or commerce

The rise of absorbent cotton in commerce, and the importance which it has attained in surgery and the arts, is due largely, if not solely to the efforts of Johnson & Johnson. They raised the standard and have kept it up. They made cotton clean, white and absorbent. They invented the system whereby it was made into sheets with a layer of tissue paper between each sheet of cotton. This at once made it an article convenient to use, and its consumption increased many fold.

They surrounded its manufacture with surgically clean and aseptic conditions, and sterilized the product. They erected buildings along surgical lines for the preparation of surgical cotton and surgical dressings made of cotton.

They trained employees in the art of asepsis, and introduced systems that transformed the whole character of absorbent cotton. They made as a standard a perfected and sterilized product of absolutely pure cellulose fibre.

A typical and crowning feature of their improvement in absorbent cotton was the form of packing introduced in their Red Cross Cotton as illustrated on the first page of this issue. This feature consists in completely encasing the cotton in tissue paper in such a way that the cotton is entirely protected from exposure to infection. In this encasement the cotton cannot become infected without breaking open the package. The cotton can be removed from its container and the portions cut from it without infecting the remainder.

The improvements made by Johnson & Johnson, as illustrated in their product Red Cross Cotton, at once placed them at the forefront in the world of surgical dressings.

They have also led the way in the improvement of the product. If they established a standard they have maintained it.

Red Cross Cotton to-day is known, used and wanted in every country in the world. It is the standard for the world's production—a standard which is imitated and striven for, but which stands in a class by itself. Red Cross Cotton is the world's standard.

## STERILIZATION

Sterilization is applied to all surgical dressings in the Red Cross Mills. This includes cotton, gauze, bandages, etc. This process is one which marks the culminating point of the surgical dressing industry.

Goods within their final containers are placed in a great iron chamber which is fitted with apparatus for exhausting the air, and the chamber is connected with a steam supply for the generation of formaldehyd gas. First, the air is exhausted to allow the sterilizing agent full access to the goods; then, the temperature within the chamber is raised until it is far above the point at which condensation is possible. At this temperature the chamber is filled with formaldehyd gas, and formaldehyd is the most powerful and effective chemical sterilizing agent that is known.

Some of the apparatus used in sterilization is shown on the next page.

## SOME OF THE STERILIZERS

Here are views of the sterilizing operation which is in use in the Red Cross Laboratories for the sterilization of surgical dressings. These are vacuum apparatus in which saturated steam, or formaldehyd steam, is applied.

The sterilization process is under bacteriological control. Johnson & Johnson were the first manufacturers to introduce sterilized surgical dressings.

## THE ASEPTIC-PROTECTING WRAPPING

Red Cross Cotton is made of carefully selected fibre in a surgical dressing laboratory.

The processes insure perfect absorbency and absolute sterility.

The result of a quarter of a century of study of cotton for surgical uses.

Peculiar to Red Cross Cotton is the form of wrapping shown here. (See also cover pages.)

This wrapping forms a complete encasing of the cotton in tissue paper in such a way that it is entirely protected from exposure to infection whether in or out of carton.

The cotton cannot become infected without breaking open the carton and then the paper.

The cotton can be removed from its carton and portions cut from it without infecting the remainder.

Red Cross Cotton is to-day the standard for the world's production—a standard which is imitated and striven after, but which stands in a class by itself.

Red Cross Cotton is the world's standard.

In ordering specify Red Cross Cotton.

# THE FAMOUS ROLL

# THE FAMOUS WRAPPING

# THE FAMOUS COTTON

**Our Method of Wrapping Means**

**RED CROSS COTTON**

**Surgically Sterile. Dust and Dirt Proof. Infection Prevented.**

**Package ends protected excludes dust, germs or contact with foreign substances.**

**ASEPSIS POSITIVELY ASSURED**

**Surgeons cannot afford to use, nor can druggists sell any other, if perfect cotton is desired. The cost is no more than the other kind.**

**Common Way of Wrapping Means**

**ABSORBENT COTTON**

**in a condition that when opened, ends of package are exposed and cotton liable to infection, causing surgeons anxiety.**

**Might mean**

**SERIOUS INFECTION**

**if used in delicate operations.**

**OUR METHOD COSTS YOU NO MORE**

## RED CROSS COTTON

**All sizes wrapped in the encasing tissue**

**Red Cross Cotton is put up in the following sizes:**

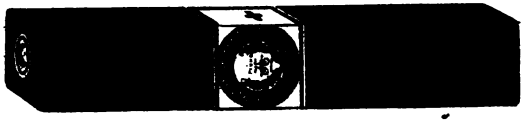
| | |
|---|---|
| ONE POUND | TWO OUNCES |
| HALF POUND | ONE OUNCE |
| QUARTER POUND | HALF OUNCE |

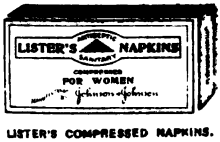
**Each roll completely encased in tissue paper.**
**Entirely protected from dirt, dust or infection whether in or out of the carton.**

**SPECIFY RED CROSS COTTON**

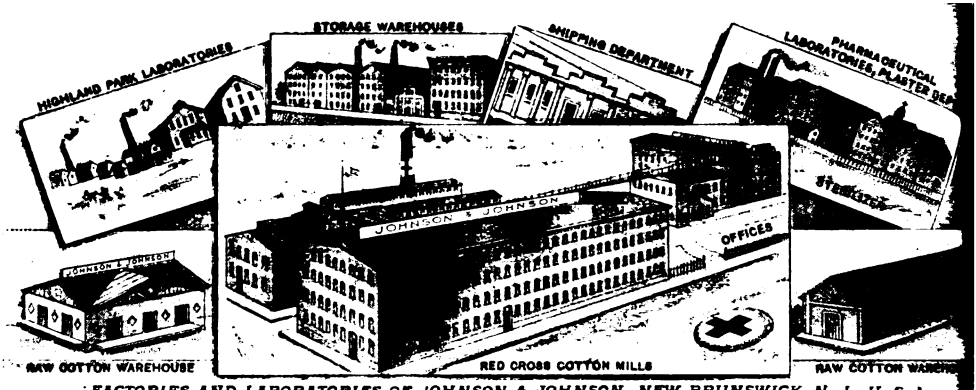
# PRODUCTS OF THE RED CROSS COTTON MILL

WOOD'S BANDAGE—TIGHTLY ROLLED, COMPACT AND PERFECT



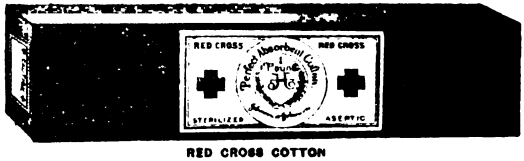



LISTER'S COMPRESSED NAPKINS.

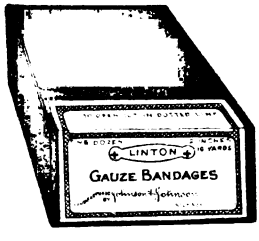


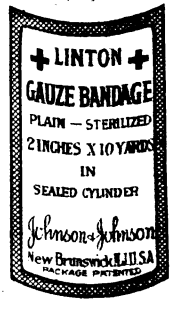

FACTORIES AND LABORATORIES OF JOHNSON & JOHNSON, NEW BRUNSWICK, N. J., U. S. A. THE LARGEST AND MOST COMPLETE PLANT IN THE WORLD. 35 BUILDINGS WITH 500,000 SQUARE FEET (11 ACRES) FLOOR SPACE: 1,200 OPERATIVES. OUTPUT PER YEAR: 25,000,000 YARDS SURGICAL GAUZE: 2,000,000 POUNDS ABSORBENT COTTON; 80,000,000 POROUS PLASTERS: RAW COTTON FIBRE CONSUMED 3,000,000 POUNDS

## PRODUCTS OF THE RED CROSS COTTON MILL




RED CROSS COTTON



Series VII. Number Three

# RED CROSS NOTES

PUBLISHED BY Johnson & Johnson NEW BRUNSWICK, N. J., U.S.A.

## A few important things

**Lister's Fumigator gives nearly one hundred per cent. efficient disinfection.**

**A new and very handy package.**

Sealed cylinder packets for Bandages afford perfect protection.

**One of the higher type of products from the Red Cross Cotton Mills.**

# Test for Yourself

Test our catgut for yourself, using any of the following methods or methods of your own. We know that any one of them will give you absolute and continued confidence in the integrity and sterility of our ligatures.

1—Put them in a test-tube containing nutrient bouillon and observe the result—no growth.

2—Test them clinically by imbedding in wounded tissue. This test is made annually millions of times all over the world by the most prominent surgeons in the best hospitals, and in private practice with uniformly satisfactory results.

Tube containing nutrient bouillon into which a strand of catgut has been placed for testing.

3—Reason it out:

This is the way our ligatures are prepared.

We begin at the slaughter house.

The immediate disinfection and cleansing of the separated tissue.

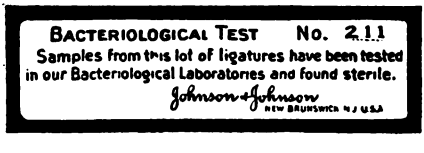
Cleansing and disinfection of each fibre before twisting into strands.

Handling of the strings under aseptic conditions.

Final sterilization and packing.

The processes are conducted under bacteriological check tests.

Result:


BACTERIOLOGICAL TEST No. 211
Samples from this lot of ligatures have been tested in our Bacteriological Laboratories and found sterile.
Johnson & Johnson
NEW BRUNSWICK N.J. U.S.A.

A cord made up of healthy, normal animal tissue, sterilized, aseptic, and unchanged in character.

Let us send you a sample of Red Cross Catgut and our "Handbook of Ligatures."

JOHNSON & JOHNSON

New Brunswick, N. J., U. S. A.

# RED CROSS NOTES

COPYRIGHT 1914 BY JOHNSON & JOHNSON

SERIES VII NEW BRUNSWICK, N. J. NUMBER THREE

RED CROSS NOTES

Published by JOHNSON & JOHNSON, New Brunswick, N. J., U. S. A.

Fred B. Kilmer, Editor

This publication is issued from the laboratories of the publishers with the intent to give, in brief, items of interest and reports of original research along the line of the particular branches of the art in which they labor.

Persons receiving *Red Cross Notes* will confer a favor by notifying the publishers of any inaccuracy in the address on the wrapper and of any change of their address.

## An Humble Apology

From the beginning the issues of these Notes have been irregular. Of late the issues have been infrequent.

If necessary many excuses might be offered for this omission.

In lieu of more frequent numbers of the Notes, our Scientific Department has sent out numerous monographs and pamphlets covering subjects usually treated in the Notes.

On the whole the profession does not lack literature; it reaches them plentiful in quantity—of all sorts and kinds.

This issue might be called an "odds and ends" number. Its message is manifold. Some of the products, not heretofore described in these pages, are noted.

Yearly several thousand new practitioners enter the field, for whose benefit it is necessary to repeat some things that have gone before. For this new race, and for the older ones who may have forgotten, there is given some "bits of history."

Many former readers have written expressions of their anxiety for more frequent issues of our publication. In response to such requests we have put together these pages.

We believe that all will find herein some items worth reading.

# Some Bits of History

Only those who have lived through the last two or three decades of medicine, surgery and pharmacy can fully appreciate the revolution and evolution that has taken place within these years.

If the greatest of the world's teachers and savants, who died before 1887, should suddenly return to life they would not be able to read the journals or the text-books of the present day. If they were suddenly to step into a modern clinic, or to a meeting of an Association, they would wonder if they had landed in some unknown world.

Johnson & Johnson began in business in 1886; in 1887 they became a corporation. This period has been particularly momentous and interesting. Events have followed each other with bewildering rapidity. In this brief span the world has witnessed some of the greatest advances since the dawn of history. Within this time science has poured out revelations which cannot be enumerated.

Almost beyond compute are the advances made in these few years in mechanical appliances, in the diffusion of knowledge, in the improvement of the conditions of life—political, social, moral and material. The race has made rapid strides.

In one of their publications Johnson & Johnson have reviewed some of the stages in their history from which the following is abstracted:

IN THE BEGINNING

In 1886 there were quite as many plaster makers as there are today. Plasters of the diachylon and pitch type were in use. The Johnsons had done pioneer work in the manufacture of pharmaceutical plasters with an India rubber base. They concluded when they entered the field that rather than contest for the trade of others already established they would create a place for themselves and then attempt to fill it; they would strive to supply commodities new in use and purpose, or which had been imperfectly made or difficult to obtain—"to make an old thing in a better way or else a new thing that is better than the old."

And from that time to the present, every year has repeated the story of some improvement in the plaster mass or the make and method of spreading, the form of packing, or some other change, something new.

Just prior to the days of Johnson & Johnson, a number of important events occurred in the history of mankind. Pasteur had overthrown the doctrine of spontaneous generation. A few microbes of disease had been caught and convicted. Out of the researches into wine and beer the science of bacteriology had its birth. Then came Lister with an attempt to clean the Aegean stables of wound infection with rivers of carbolic acid. From Lister's great conception was born modern surgery.

Lister's results and ideas were received with both welcome and scorn.

A feature of the first years of the era was the introduction of new antiseptics. The list of surgical antiseptics noted, as in use in 1895, numbered nearly five hundred.

The strength of antiseptics used in those days stands as a marked contrast to the present practice. The first methods required the use of cumbersome apparatus and processes, so that details could only be carried out by experienced surgeons.

The dressings obtainable by the great bulk of practitioners were, for the most part, unreliable or unusable and, in consequence, the application of Listerism was hampered by the lack of proper and easily obtained dressing material.

To meet this need Johnson & Johnson devised a system of dressings that fulfilled the demand of the best surgical practice under the then new Listerian system. It is acknowledged that the introduction of Johnson & Johnson's dressings marked the real beginning of antiseptic surgery in this country. This the Johnsons did at the time when many of the profession were still in doubt about accepting the theory and doctrine of antiseptics.

An important point which characterized the dressings prepared by Johnson

& Johnson at that time was their being packed in a manner that made it possible to distribute them through the drug trade without contaminating the dressings by handling or climatic changes. They were prepared so that they would reach surgeons at most remote points in perfect condition. And they were prepared in a form so simple that any one could secure and use them. The packages were constructed so that surgeons could, when necessary, remove a portion of the dressing without contaminating the remainder.

Books and pamphlets issued by Johnson & Johnson, 1887-1897.

Chemical sterilization and mechanical cleanliness are among the newer weapons that have been called to the aid of surgery. Antiseptic dressings have been made surgically clean. Antisepsis has not been abandoned, but has developed into its higher form; asepsis, and antiseptic processes have become aseptic.

More than five feet of books. Bound volumes of literature issued by Johnson & Johnson.

As the goods and their uses were entirely new, the question of introducing them to the profession involved no small expenditure of labor and money.

At the beginning of the year 1890 Johnson & Johnson goods had become known throughout the United States and in foreign countries. Since that time every effort has been made to keep abreast of the times in the advancement of the art and practice of surgery. At the end of ten years the word "asepsis" became engrafted into the language and into the practice of surgery. Johnson & Johnson had introduced sterilized dressings.

For the production of dressings suited to the requirements of surgery, Johnson & Johnson have established a series of laboratories, planned and built for the sole purpose of making surgically clean, aseptic dressings.

# Bits of History

The processes employed in these laboratories for the practical application of scientific knowledge is the outcome of the application and amplifications of procedures brought about by the evolution of surgery.— Extract from "Asepsis Secundum Artem," 1897.

This, in brief, is the humble part taken by Johnson & Johnson in the production of surgical dressings from the dawn of Listerism to the time of its amplification and evolution into asepsis.

tion itself. They are stamped upon every article which Johnson & Johnson make. They are familiar marks to users of this make of wares.

These identifying marks mean something. Placed upon a package, they are like a signature upon a bond. They identify the origin, the integrity, the value of the contents. They guarantee the article which they accompany to be of the highest quality and workmanship.

A sample of every batch of plaster made in these laboratories is filed for examination and for reference. By these records the exact history, method of manufacture and composition of any individual plaster can be traced.

In the minds of the medical and surgical profession over the entire globe these marks insure confidence. These marks fix a standard which every worker of the company must live up to.

Wherever these marks appear upon a package they stand as a guarantee that the article is precisely what it is represented to be.

To old friends these marks are familiar symbols.

Those to whom the goods are new may take them up with full faith and confidence.

The basket border, the peculiar signature of Johnson & Johnson, and the Red Cross will always be the symbol of highest quality and integrity.

## THE COVER PAGES

The pages which cover this issue of Red Cross Notes are worthy of study.

For one thing, there is pictured some of the staple and some of the new products of the house. These are shown in their actual, natural colors—facsimiles of the packages themselves. The delineation is our own handiwork (J. & J. Print Shop).

Then we have the characteristic basket border, the peculiar script signature, Johnson & Johnson and the Red Cross. These marks are as old as the institu-

# Confidence

Without complete confidence in his catgut the surgeon feels a certain worry that is ever present while he operates.

If his catgut is too brittle it often breaks at the knot.

If it is not strong he must use larger strands than he cares to.

If not strong he does not trust it and may not put enough pressure at the knot causing a poor tie—then the ligature slips.

If the second knot does not lie flat on the first throw, it may become united later.

Every lot of catgut in J. & J. Laboratories is tested in nutrient bouillon before sending out.

It is almost impossible to tie a good knot with brittle catgut, because the gut is not soft enough to allow flat knots. They either become untied or the surgeon breaks his catgut in trying to bring the second knot down tightly against the first.

Catgut must be sterile—but if there is trouble at the knot the surgeon can never have full confidence in it.

Johnson & Johnson begin sterilizing the raw lamb's gut before it is twisted into a suture. The twisted material is sterilized again in the tube after the tube is sealed. It is soft and pliable and to an expert, the very feel of it indicates that it will "run even" while tying a knot.

Our gut is sterile before twisting, after twisting, and remains sterile in the tube.

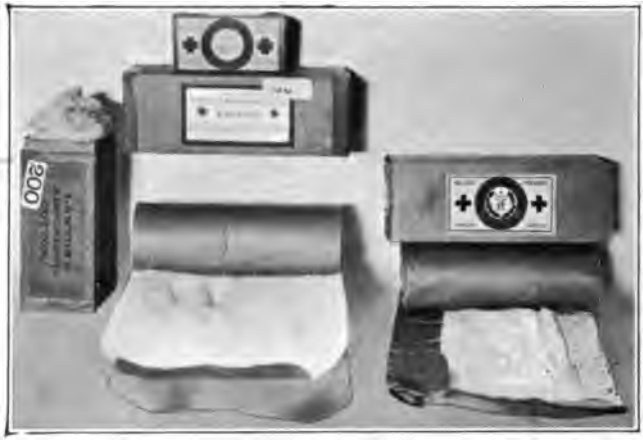
Samples will be sent upon request.

JOHNSON & JOHNSON,
New Brunswick, N. J., U. S. A.

## FROM COTTON WOOL TO ABSORBENT COTTON

Storm clouds gathered in the middle of the last century when it was proposed to use cotton fiber and cotton wadding or batting as a covering for wounds.

Pungent strictures, bickerings, anathemas were hurled against the propounders. No one listened to Touraine, who suggested a hydrophile cotton.




The package on the left (200) shows the method of packing absorbent cotton prior to that of Johnson & Johnson. The unrolled packet in the foreground at the left is the first form of rolling in tissue. The packet above this is the first form of sterilized cotton; the small packet is compressed cotton for army and navy use. The packet and roll on the right is the present form of complete encasement in protective tissue.

When Listerism came, wounds were covered with tow, oakum, jute, cotton wadding, cheese-cloth and what not soaked in carbolic acid.

Somebody began to make cotton that would absorb liquids.

Absorbent cotton made its appearance in trade about 1877. With the advancement of surgical methods it was recognized as an important article.

In 1881 the price ranged from one to two dollars per pound.

When absorbent cotton first came into use it was supplied in the form of wads, or masses of inconvenient shape. It is safe to say that almost as important as absorbent cotton was the invention of putting it up in a way that made it convenient for the surgeon to handle, viz., rolling the cotton into sheets with tissue paper between the layers. This simple device was of the highest value in popularizing the use of absorbent cotton. It was the work of Mr. James W. Johnson, now president of Johnson & Johnson.

It is a matter of common acceptance that Johnson & Johnson have introduced improvements whereby the absorbing power, whiteness, elasticity and all the desirable qualities of absorbent cotton have been increased.

The progressive labors of Johnson & Johnson in perfecting absorbent cotton have often been described. One of the earliest issues of Red Cross Notes gives the following:

"From the beginning of Johnson & Johnson's manufacture of surgical dressings they have held that as absorbent cotton is to be used for wound dressing it must be made and marketed fit for the most delicate uses of surgery.

"They have raked the earth for the best processes and the best employees to carry out this idea. They have built buildings, fitted up rooms better than those in the finest hospitals, trained operatives, established bacteriological and

chemical laboratories. The outfit for making surgically clean absorbent cotton and dressings has cost them no end of time, energy and money to bring it to its present high state of perfection."

In 1900 the erection of a cotton laboratory for the sole purpose of supplying cotton for surgical uses, together with the equipment of these buildings, and the installation of machinery and apparatus on the lines of a modern hospital, was conceded to be an important event in the surgical world. These buildings are cotton mills of the most advanced type. At the same time, they are surgical laboratories. They were the first factories in the world where raw cotton was transformed into surgical dressings in accordance with the teachings of modern science. The influence of this work has been felt wherever cotton is used in surgery.

Very important was the introduction of absorbent cotton fiber. The typical and crowning feature, however, was the improvement in packing, whereby the cotton is completely encased in tissue paper in a way that entirely protects it from exposure to infection. This latest improvement places absorbent cotton in the highest rank for use in surgery and in the arts.

The importance which absorbent cotton has attained is due largely, if not solely, to the efforts of Johnson & Johnon. It is through their efforts that the consumption of absorbent cotton has increased manifold. To-day Red Cross Cotton is used in every country of the world. It is the standard for the world's product, the standard that is imitated and sought for, but which remains in a class by itself.

---

## A RAPID AND SAFE METHOD

### OF LIGATING VESSELS AND OTHER BLEEDING POINTS

The difficulties encountered in tying the knots commonly used in surgery, especially in deep-seated structures, and the causation of secondary hemorrhage due to slipping of a ligature, with all the unpleasant sequelæ, are so well known and appreciated that they are the object of great concern.

Dr. M. J. Wunderlich, of Guatemala, devised a technic for ligating vessels and pedicles at once so simple and speedy that it deserves careful consideration. The procedure is as follows:

The thread, with a knot already prepared but still open, is slipped over the forceps or clamp either near the end of the forceps, with the edges slightly separated and ready to grasp the bleeding point, or placed around the forceps near the finger rings. The ligature can also be previously prepared, leaving a sufficient loop to enable one to pass it over the forceps, from the proximal end, without difficulty.

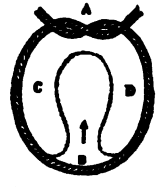
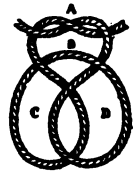



Fig. 1—The first step is the same as in an ordinary or overhand knot. It is now grasped between the thumb and first finger of the left hand at the point marked "A"; and with the right hand, the point marked "B" is brought in contact with "A," where it is provisionally held against the thumb with the third finger of the left hand.

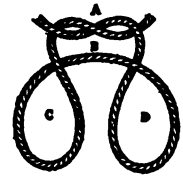
Figures 1 and 2 show the steps of making the knot.

Figure 3 shows it completed.

These ligatures should be prepared as shown in figure 3 in sufficient number before operation so that no time be lost.




No. 2




No. 3

Fig. 2—The two resulting circles are given each a half turn to the right, as shown.

Fig. 3—Knot completed by placing circle or loop "D," over circle "C." (The knot can also be made by forming first the loop "C" then the loop "D," finishing by a simple or overhand knot over both of them.)

Attention is drawn to the fact that if two or more fingers of each hand are inserted into the circles C and D formed by the open knot it will be found impossible to enlarge them no matter what force may be applied, while if the ends of the threads are drawn a very tight knot will result.

# Handy Appliances

## Aseptic Glass Cotton - Font

**With continuous feed, compressed coil package of**

**Dentoform Absorbent Cotton**

A superior grade, long fiber, highly absorbent, cotton. This font is particularly adapted to all uses where a small quantity of absorbent cotton is used at a time, such as small pledgets in nasal operations.

The desired amount of cotton is detached with the pliers, *using one hand only,* and conveyed directly to the point of operation. A supply of surgically clean cotton, in compact form, always at hand without preliminary preparation. Reloaded with a new package in an instant. The inverted cover fits in the top of the font and may be used as a tray for pellets. A depression on the outside top of cover is for medicating dressings.

Aseptic Glass Cotton-Font loaded with one package Dentoform Cotton.....$0.75
Dentoform Absorbent Cotton continuous feed cylinders per dozen packages... 1.00
" " " " " " each ..... .10

## Aseptic Glass Dish **For Napkins**

A shallow, square glass dish made just to take in the six inch Aseptic Napkins. Dust proof. Keeps the napkins absolutely clean and always within convenient reach.

The Red Cross is enameled on the side and the words Aseptic and Johnson & Johnson etched in the glass. Very attractive in appearance and its many advantages will be recognized at once.

For Six Inch Napkins ..... .....each $1.50

## Aseptic Glass Jar

This jar primarily designed for holding cotton dental rolls is equally valuable as an aseptic container for other forms of absorbent dressings, such as pledgets of cotton, gauze mops, etc., in specialty work.

Made in two sizes.

Large Size, 7 in. high x 4½ in. diam., each $0.95
Small Size, 3½ in. high x 4½ in. diam., each .85

**JOHNSON & JOHNSON, New Brunswick, N. J., U. S. A.**

## CONTAGIOUS DISEASE BULLETINS

From the Scientific Department of Johnson & Johnson, bulletins dealing with the treatment of consumption, diphtheria and other contagious diseases of the most prevalent types have been issued from time to time. These bulletins have now been combined under one cover and the complete set is sent to any address for a two-cent stamp.

The well known "Book With a Mission" forms a part of this collection. This valuable little pamphlet probably contains more useful information than was ever before stated in so small a compass. Starting with an accurate and clear description of the way in which communicable diseases are spread, the book goes on to explain the methods of prevention. The simple and complete instructions as to isolation, disinfection and general care of the patient make this pamphlet uniquely valuable, and we are not surprised that so many physicians have placed copies of it in the hands of their patients.

Besides a "Book With a Mission" there are included under this cover bulletins on consumption, scarlet fever, smallpox, typhoid fever, whooping cough, measles, meningitis, and diphtheria. In every case the general scheme of the pamphlet is the same. First comes a discussion of the nature of the disease, its origin, danger, preventability and curability. Then comes simple rules as to avoiding the disease in question. After this comes directions as to the general care of the patient, so that his recovery may be hastened and so that he may not be a source of danger to the community in which he resides. In most of these pamphlets there are also carefully prepared directions as to the disinfection of the patient's room after his recovery or death.

A glance at any of these bulletins is sufficient to convince the reader that they are not "Doctor Books" and that they cannot in any way induce the patient to try to heal himself. Their purpose is to furnish physicians and boards of health with convenient copies of such information as they would desire to be widely circulated, especially at the time of epidemics. Any single bulletin is sent free, and the complete set for a two-cent stamp. A card of rules for the use of nurses and attendants to be hung on the wall of the sick room is also furnished on request.

---

To eat in a hurry and get dyspepsia, to marry in a hurry and get a divorce, to get religion in a hurry and forget it in a hurry, to die in a hurry and go to the devil—these: according to a well-known artist are the chief acts in the life of the modern American business man.

---

### THE SURGEON'S HAND—"HE MAKETH THE BLIND TO SEE."

Mary Murdock Mason, in the Century.

Beneath his wrist there stirs a sun-god's thought,
A strong magnetic current swiftly flows
Through palm and finger-tip, and power bestows
On tiny blade of steel with promise fraught.
Up toward the eye the charged blade is brought.
Marble, moonlit, the arched cornea shows.
The iris, lying lakelike in repose,
And the deep pupil where the soul is caught.

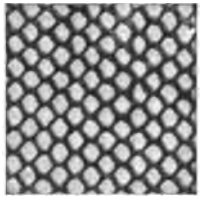
"Let there be light," he says—"Let there be light."
And, solemn as the sign of the cross, the hand
Performs the miracle. At that command
The pulsing thought leaps toward the blind man's night.
Symbolic, like a dove's flight to its nest,
The haloed hand drops down and is at rest.

## VACCINATION

By SAMUEL T. KNAGGS, M.D., F.R.C.S.,I.

Vaccination not only involves an operation of making an incision through the skin, but also necessitates impregnating the wound with an active virus so as to infect the subject with a specific disease which subsequently modifies any future invasion of smallpox that the subject may acquire.

Having availed myself of modern



improvements in antiseptic surgery I have evolved the following technique for vaccinating a large number of people at a time:

(1) That vaccination be conducted in a well lighted and ventilated room properly sanitated and free from dust.

(2) To have a door for entrance and another for exit.

(3) On entering, a clerk to take the name, age, sex, occupation and residence of person to be vaccinated.

(4) Assistant No. 1—To assist subject to undress and expose area of operation.

(5) Assistant No. 2—Scrubs the arm with soap and hot water. (To use fresh swab of cotton wool and separate basin of water for each case.)

(6) Assistant No. 3—Sterilizes vaccination area with pure alcohol.

(7) Vaccinator scarifies selected place and applies vaccine.

(8) Assistant No. 3 covers vaccination wound with sterilized protective tissue and secures the dressing with a bandage.

I consider this latter to be of the greatest importance.

I am indebted to Messrs. Potter and Birks, of Grosvenor House, Sydney, for introducing to my notice two admirable adjuncts for the antiseptic treatment of vaccinations:

1. Johnson's Rubber Mesh Protective.
2. Mogaze Sterilized Sponges.

The first is a sterilized rubber-coated netting to be placed over the vaccination wounds and to be secured by means of

"Z O" adhesive strips above and below. This netting forms a protection to what may soon be a suppurating surface and prevents whatever dressing that may be applied from adhering to the delicate tissues or the crusts that may form on the vaccination spots. These dressings can only adhere to the netting and can easily be removed without tearing or lacerating the tissues which it protects. The subject is requested not to remove this netting under any circumstances. Should suppuration occur, as may happen after the first week, the dressing over the netting may be removed, the netting then washed with water that has been boiled, the part carefully dried and then dressed with vaseline spread upon a clean piece of linen, just large enough to cover the suppurating surface. This cleansing and dressing to be done daily if necessary, but under no circumstances is the netting to be removed, as doing so would lacerate tissues and promote irritation.

The Mogaze Sterilized Sponges are small pads made of cotton wool, enveloped in muslin, and make an excellent dressing to be applied over the net rubber mesh protective. The bulk of

this sterilized pad over the vaccination area allows of an elastic pressure when bandaged on the arm which relieves tension when several days later the arm may feel swollen and uncomfortable. If then the bandage should feel too tight, it may be removed and re-applied less tightly without the pad being touched. Should suppuration occur and make the arm feel uncomfortable, the pad may be carefully removed and the part washed and treated with vaseline dressing as directed above.

Out of 1,050 vaccinations recently conducted under my personal supervision upon the above lines the only bad results occurred to those who, through following the advice of injudicious friends, had removed all the dressings and exposed the wounds to atmospheric influences.

By the method adopted as outlined large numbers of persons can be vaccinated under strictly antiseptic precautions with celerity, and after my assistants became familiar with their work I found it quite possible to vaccinate at the rate of one hundred and twenty per hour without exercising any undue haste and at the same time taking every possible care.

## QUALITY AGAINST PRICE

Upon the reliability of surgical dressings such as cotton, gauze, bandages, lint, lamb's wool and other items such as "Z O" adhesive plaster, ligatures and sutures, antiseptics, disinfectants, etc., depend the life of the patient and the success of the surgeon.

The manufacturer whose goods in this line are the most satisfactory is probably the one who has been most progressive.

It is quite evident that a first-class quality of these products cannot be compared with a lesser qualified line in a monetary ratio.

A statement in a pamphlet issued some time since by Johnson & Johnson applies with equal force at the present time:

"From the beginning of our experience in the manufacture of the products produced in our factories and laboratories we have applied ourselves to one single effort—the preparation of our surgical dressings and all other relative products that shall meet the requirements of and embrace advances in the art of surgery. While not presuming so much as to suggest to a physician or surgeon the kind or the make of material he should use in wound dressing, we believe that disappointments and serious results will follow unless he demands and uses dressings prepared in a manner equal to the methods we employ, or according to the art of asepsis."

It is quite evident that a line of goods of this character made up in the laboratories under absolutely aseptic conditions, sterilized by the latest processes and appliances, packed and sealed in the most perfect manner to retain their sterility, cannot be compared with a lesser qualified line in a monetary ratio. The surgeon of repute is always willing to pay the price when he is satisfied he is getting high-class necessary supplies at a reasonable cost.

## SPECIFY THE BRAND WHEN ORDERING

When purchasing from the wholesale or retail druggist such merchandise as drugs, fluid extracts, ligatures, tinctures, ointments, surgical dressings, tablets, soaps, oils, syrups, pills, plasters or other requirements, the physician and surgeon should specify the brand he wants. If he fails to do this there may be foisted upon him something that is not so pure, soluble, strong, dependable, lasting, improved, modern, perfect or otherwise lacking.

It is an easy matter for retailer or jobber to buy and carry in stock the products of the best manufacture; the best manufacturer is the most successful; consequently, he has a greater output, which obliges him to buy larger quantities, thereby opening to him a market unapproachable to some others. He is thus able to buy the best goods at the lowest price and get the quickest deliveries. When you specify on your order to the dealer he recognizes you know what you want; he appreciates he is there to serve you; he is obliged to carry a first-class stock to command your business.

All this results in equitable and profitable transactions and all participants are pleased, satisfied and successful.

# The Doctor and Cleanliness

SOAP AND HEALTH

Pioneer work in disseminating the doctrine of cleanliness has always been done by physicians of every community. All doctors know that without cleanliness there is disease, hence without soap there is no health.

Most doctors, for sanitary and pro-

phylactic reasons, now use Synol Soap, the antiseptic liquid soap, because they know that it sterilizes the skin far better and more certainly than any other non-injurious preparation. These reasons alone would suffice to recommend Synol Soap to your patients. But there

are other and many more potent reasons why the following suggestions from the doctor as to the use of Synol Soap will be more than welcome in every home, and may help to prevent sickness.

"The cake of soap is unsanitary. Everybody in the house uses it, some of the dirt from the hands remains on the soap, and there you have a mixture of soap and dirt, multiplied with each successive use. *This may cause disease.*

"Some other person, a stranger or visitor, may use that same cake of soap; perhaps they have a skin disease—a

sore, or something; you get it—in fact, rub it into your skin with this same soap. Is that cleanliness?

"There may be a contagious disease in your house. Your little child has scarlet fever, or measles. To enter the sick room, or to take care of the patient, may not infect you, but your hands may carry the disease to others. *This is how diseases are spread.* Washing the hands with Synol Soap reduces the chances for infection to a minimum.

"Soap and water are the only two things which may be used for cleanliness and sterilization, but the soap must be the *right kind of soap*, and it lies within your reach, as well as within a doctor's."

Medical and sanitary authorities, boards of health, have deprecated the use of the cake soap, and you will find

very few public washrooms today that provide cake soap for the people; we therefore maintain that it is equally unsanitary in a home.

Given a soap which is, to the doctor, a valuable cleansing and sterilizing agent, it is but reasonable to expect that

it will serve the same purpose to the patient. Synol Soap can be used wherever and whenever a soap needs to be employed, no matter if it be to wash a baby's skin or sterilize a surgeon's hands.

In diluted form it makes an excellent mouth wash. It is the most effective soap for a shampoo, especially in seborrheic conditions of the scalp; in the bath it will cleanse the body thoroughly, open the pores, and destroy bacterial accumulations on the skin surface.

Synol Soap does not irritate the skin or mucous membrane, is refreshing and has the characteristic "clean" odor.

Being put up in convenient sprinkler top bottles, contamination of the unused portion is impossible.

Suggestions such as the above, coming from the doctor, must be regarded seriously by every person, and if followed carefully will undoubtedly prove helpful to the physician in his daily work and hasten the cure of any disease in which uncleanliness proves a retarding factor.

---

## FAR MORE EFFECTIVE MUSTARD PLASTERS

For many years mustard poultices were recommended by physicians as a rubefacient. During the early career of this well known remedy it was a home-made article. Gradually it became a ready-made product of a number of manufacturers. Today there are many more mustard plasters of the latter class in use principally because of their convenience without any loss of the desired effect.

It is a well known fact that moist air coming into contact with mustard plasters deteriorates their quality. Dampness causes a decomposition of the elements of the mustard, the essential oil is released or destroyed, and the plasters rendered useless.

Johnson & Johnson accomplished a solution of the difficulties in the preparation of mustard plasters. A moisture-proof and easily opened package has been produced as a container for Red Cross Mustard Plasters. It is a round spun metal tube, seamless, with no openings to let in any dampness. When the lid is placed closely on top it gets into contact with a perfect joint—metal against metal.

Johnson & Johnson's Mustard Plasters are made of the purest and most select Italian black mustard seed. In their preparation the fatty oils and resinous matter are removed, leaving only the elements which, when properly wet and applied, produce the essential purpose of mustard.

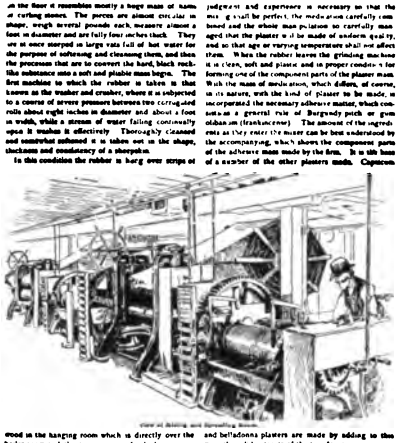
All through the methods of their production every precaution is taken to protect them against access of moisture and the container is hermetically sealed under dry atmosphere.

The quality of these plasters, together with the improved new package, is a step in advance. They will remain in perfect condition in any climate. Physicians will find them fully worthy of their specifications whenever opportunity occurs. No advance in price.

## THE OPEN BOOK

By H. P. NICHOLS

The characteristic policy that has actuated Johnson & Johnson from their earliest days is illustrated in a time-worn circular that lies on my desk. It is a reprint from the Pharmaceutical Era of April, 1887; its title is "The Manufacture of Medicinal Plasters."



A circular issued in 1886 describing how plasters were made.

This little reprint is interesting from a historical standpoint in that it gives the history of the making of India rubber plasters. It is illustrated with crude pictures of the apparatus then used in plaster making. The essence of the document is that for the first time there is revealed the methods, the apparatus and constituents of the India rubber plaster.

Prior to this, plaster making had been a closely guarded secret; at one stroke Johnson & Johnson swung open the doors, taking the medical profession, the drug trade and the world into their confidence, and told them how plasters were made. Open-handed frankness, sincerity and a square deal illumined the birth of Johnson & Johnson, and has continued to this day.

Volume upon volume has been issued showing the formula and methods of manufacture used for their products. In one of these issues it is stated: "The publishers of this volume have always held that the consumers of their products are entitled to full information as to the details connected with their manufacture."

Thus we find pamphlets telling how gauzes are made, how absorbent cottons are made, how ligatures are made, the machinery and apparatus used are illustrated, the formulas are given and the processes minutely described.

No manufacturer, save perhaps the elder Squibb, has ever approached this frankness in promulgating manufacturing details. Most manufacturers give as little information as possible as to how their wares are made.

Some manufacturers rigidly exclude seekers of information—here all is open. It is no secret that this frankness has been used to the detriment of Johnson & Johnson, as competitors have been quick to seize upon the information that has been so freely given.

This same publicity policy has continued from the inception of Johnson & Johnson down to the present day. The medical profession, the drug trade and the consumer know what the goods are made of, how they are made and all about them. In such publications as "Laboratory Records" they tell how the goods may be tested and their integrity proven.

This open-court frankness should, and does, entitle Johnson & Johnson to the confidence of the trade and the profession.

# Adhesive Plaster in Therapy

In all the practice of medicine there is no one remedial agent which has so large a field of usefulness as adhesive. plaster. Its applicability is well nigh unlimited and in its immediate result it is unsurpassed. In so short an article we can only begin to describe a small number of conditions in which it is of value, but a description detailing the manner in which it effects its therapeutic purpose will undoubtedly open up to the thinking physician a great variety of cases where it is indispensable and curative.

The most essential and logical requirements in many forms of affections are protection and compression, and no appliance known in medicine provides protection and compression so uniformly and perfectly as adhesive plaster. This fact is evidenced by repeated and successful applications of plain "Z O" Adhesive Plaster to inflammatory conditions which tend toward suppuration, such as mastitis, boils, carbuncles, ulcers, etc.

A perfect understanding of the physiological action of compression is necessary. The pressure exerted by "Z O" Adhesive Plaster produces hyperemia, which aids in carrying off or absorbing the debris, and this soon clears the pathological condition which follows.

Compression limits the extension of the diseased portion of the body in cases of abscess and ulcers. A compression dressing of adhesive plaster confines the process of disease to the initial lesion and, in many cases, prevents suppuration (pus formation).

Sprains, fractures, dislocations, etc., need additional treatment to limit motion. This limitation of motion, properly interpreted, means motion without exertion. In many cases adhesive plaster will replace plaster of Paris to great advantage.

Immobilization is, without a doubt, the treatment par excellence in fractures of the long bones, where perfect rest and immobility are essential to their union. But after union has taken place and motion becomes imperative to prevent ankylosis and a regeneration of the parts the application of adhesive straps, properly applied, will allow sufficient free movement with the necessary inhibition of overwork.

One of the most important functions of properly adjusted adhesive plaster dressings ("Z O" plain) is the continuous massage that this dressing gives. The importance of this is obvious. If the adhesive plaster dressing is placed during a fracture or after the plaster of

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 1—Neurasthenic and Rheumatic Spine.
Fig. 2—Application in gastric neurasthenia, movable kidney, gastro-enteroptosis, etc.
Fig. 3—Floating Kidney; Gastroptosis; Falling of the Viscera; Pendulous Abdomen, etc.

Paris has been removed, it limits motion and by compression produces a constant mild friction. This friction aids in the regeneration of the tissues by admitting of a vigorous blood supply. This limits the inflammation and restores an early use of the part.

No other dressing accomplishes as much as adhesive plaster. And in "Z O" Adhesive Plaster Johnson & Johnson have produced a perfect combination of qualities—it is exceedingly strong, yet is a light fabric with a retentive, adhesive surface of a non-irritating substance. Considering the time that the plaster remains on the skin, these qualities are of utmost importance.

Since the results obtained from the therapeutic application of plain "Z O" Adhesive Plaster are so varied and so excellent, it is obvious that an adhesive plaster in which a medicinal agent is incorporated must possess the additional quality of being a curative preparation on account of the absorbing property of the skin.

First and foremost, "Z O" Adhesive Plaster has its greatest usefulness in conditions requiring immobilization and compression. Among the conditions may be enumerated orchitis, epididymitis, mastitis, neuralgia, lumbago, sprains, fractured ribs, fractured clavicle, boils, abscesses, inflamed joints, synovitis and many other conditions.

Even and graduated compression is one of the most efficient means we possess for removing inflammatory or traumatic exudates, or collections due to non-inflammatory circulatory disturbances such as occur in certain diseases of important viscera. In such conditions the most satisfactory treatment is strapping with adhesive plaster.

In the edematous swelling so often seen during the course of kidney, liver and heart diseases, compression with appropriate strapping will give the necessary support and prevent effusion.

In the treatment of affections of the breast compression is exceedingly valuable and by itself affords much comfort and relief as long as there is no purulent collection. But even after an abscess has been evacuated compression by means of rubber adhesive plaster serves to promote absorption, if so placed as not to interfere with appropriate drainage.

Proper bandaging and support in mammitis is a mode of treatment known to every practitioner and nurse. The application of a rubber adhesive plaster is an easy and effective way of accomplishing this result.

In the presence of a painful joint, whether the pain is due to an inflammatory condition caused by systematic disease, such as rheumatism or gout, particularly in their sub-acute forms, or to

Fig. 4.

Fig. 5.

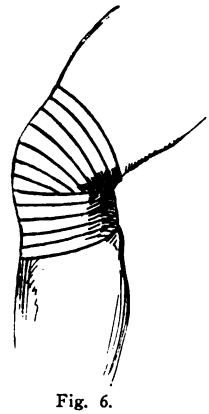


Fig. 6.

Fig. 4—Painful Knee, Sprain and Rheumatism. One-inch "Z O" Strips applied to obtain compression, limitation of motion and massage. 1st strip.
Fig. 5—Front view complete dressing.
Fig 6—Side view complete dressing, knee bent.

actual traumatism of the joint, without penetration, or to injury of periarticular tissues, rest is of the first importance. If the rest can be combined with even and steady compression an ideal method will have been obtained.

This object may be well attained by the proper use of rubber adhesive dressings. To obviate the danger of constriction the dressing must be applied from below upwards, any dependent position of the limb must be avoided, and watchful care must be exercised.

cold or heat, the swelling has diminished. In general it is believed, however, that the Gibney dressing may be advantageously employed at any stage of the injury.

Considering the immense value of plain "Z O" Adhesive Plaster as a curative agent in conditions where compression, limitation of motion and massage are indicated, it must be apparent that a plaster wherein is incorporated a medicinal agent such as Belladonna, Mustard, or Capsicum possesses an

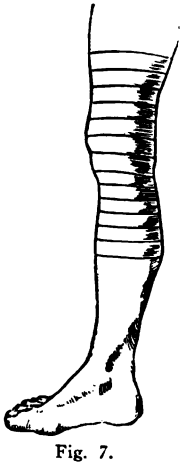
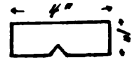


Fig. 7.

Fig. 8.



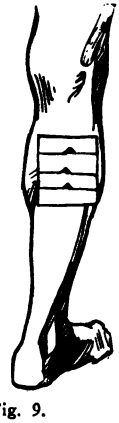


Fig. 9.

Fig. 7—Circular dressing involving leg and thigh.
Fig 8—Weak Ankle; Sprain. "Z O" Adhesive Straps, two inches wide, to encircle ankle, leaving ½ inch open at front to permit free circulation.
Fig. 9—Ulcer of Leg. Notches cut in plaster to permit discharge. Put gauze bandage over all.

The joints most frequently benefited by adhesive strapping are the phalangeal articulations, the wrist, the knee and the ankle. The wrist is very subject to sprains, and a well fitted adhesive plaster dressing gives more relief than any other mode of dressing. We know that any reasonable degree of constriction of the wrist is usually quite safe.

This procedure is adopted in sprains, synovitis, sub-acute rheumatism, and in teno-synovitis of the extensors of the thumb where they pass over the wrist joint.

In sprains of the ankle joint, many surgeons apply the Gibney dressing whatever may be the amount of pain or swelling, while others prefer to wait for a few days until by rest in the recumbent position and the application of additional therapeutic property of no small importance.

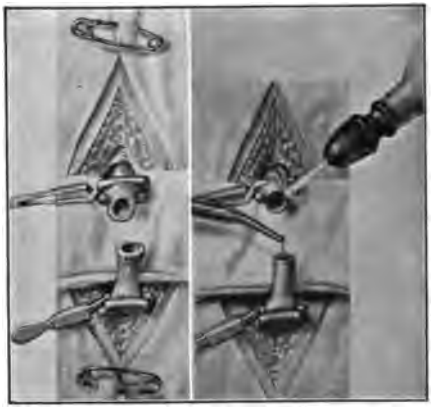
In mastoiditis, wry-neck, bronchitis, asthma, angina pectoris, acute affections of the kidneys, uterine and ovarian pains, Belladonna or Capsicum Plasters have been successfully employed by many, many physicians.

All in all there is no denying the fact that in "Z O" Adhesive Plaster or medicated plasters the general practitioner and surgeon has a therapeutic agent which has been, and forever will be, a valuable adjunct in the treatment of a great variety of diseases.

The accompanying illustrations demonstrate the method of application in some of the conditions and the kind of plaster most effective.

# Blood-Vessel Surgery

Alive to the most recent advances in surgical technic and endeavoring at all times to keep at the head of the procession in the preparation of surgical necessities, Johnson & Johnson have recently prepared, under the direction of Dr. Bertram M. Bernheim of the Johns Hopkins Hospital, Baltimore, sterile



On the left, severed end of an artery. On the right, washing out vessels with liquid vaseline.

sutures for the repair of blood-vessels.

In Dr. Bernheim's book, "Surgery of the Vascular System," there is given the methods of procedure by which the author secures the beautiful results he describes in repairing blood-vessels.

Dr. Bernheim states in the opening paragraph of the chapter on General Technic that the success of blood-vessel work, anastomoses, transfusions, repair of injuries, etc., depends almost entirely on the avoidance of a blood-clot—and a general technic has been evolved which if properly observed gives most consistent results.

The peculiar method of working in liquid vaseline developed by Dr. Bernheim is described in the following words: "During the entire course of any operation involving blood-vessels, the haemostasis must be absolutely perfect, or as nearly so as possible. All branches, large and small, capillaries excepted—should be cut between two clamps and tied. Despite these precautions, however, there will always be a certain amount of staining, which is best removed with gauze sponges wrung out in normal salt solution. In addition to this a stream of warm salt solution should be played on the wound at intervals during the entire course of the operation, especially after exposure of the vessels. This is not alone for the purpose of removing blood and clot, but to prevent drying of the tissues as well—a phenomenon that occurs with striking rapidity in wounds of this character, and one that is to be avoided at all costs. Indeed, so careful must we be in this respect that we have called to our aid another agent better qualified to prevent drying than salt solution—liquid vaseline, a neutral lubricant that keeps the tissues soft and pliable, prevents too rapid evaporation, and is tolerated by the organism in almost any quantity. The combination of salt solution and liquid vaseline, each judiciously used, keeps the wound in a beautiful state of pliability that renders all manipulations much easier to accomplish and less liable to damage any of the delicate structures handled."

In regard to suture material, Dr. Bernheim states:

"It is my custom to use black silk thread (00000), since that can be seen against a white background much more easily than a white thread against a black background, the latter being Carrel's method. I have noticed absolutely no difference in the healing or in the operative results following the use of either the white or black thread; the dye in the thread used for blood-vessel suture is fast and almost infinitesimal in amount.

"All needles (No. 12 sewing needle) are threaded and sterilized in liquid vaseline before operation, the routine being to thread each needle with about twelve inches of the black silk, drawing the ends even and fixing each needle on a separate piece of ordinary writing paper, about one-half inch by one-quarter inch, in such a way that the doubled thread is wound around the needle by a figure-of-eight, and the final end of the thread caught by a slit in one corner of the paper. Thus prepared, four threaded needles are placed in a small flask containing one or two ounces of liquid vaseline and sterilized in the usual way. Just before operation the contents of

one or more flasks, oil as well as needles, are poured into a dry sterile medicine glass and placed on the instrument table. I have made it a rule to allow no one but myself to touch these needles at operation, and I leave them lying in the oil until the time for actual suture comes, when I carefully remove one needle from its paper by going through the

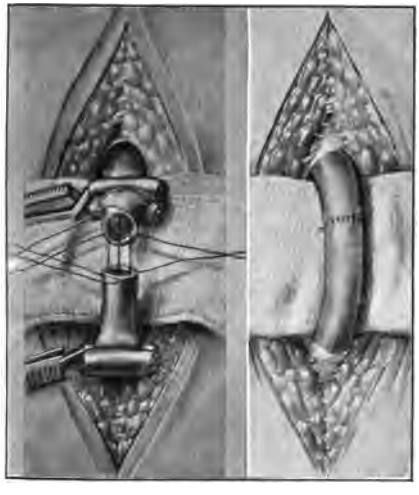


Figure on left, three stay sutures placed. On the right, suture complete.

reverse figure-of-eight. One end is then shortened to about two inches, and the needle and thread are given a final inspection for any defects, such as small spots of rust or inequality or roughness in the silk. If this examination is satisfactory the suture is begun, a similar procedure being observed for each additional suture that may be needed.

"Attention to many details that experience alone can teach is required to secure constant results in this field of surgery, but success will more than compensate for the patience and energy it demands."

The sutures prepared under the instruction of Dr. Bernheim consist of a very fine straight sewing needle threaded with very fine black twisted silk, each needle and suture put up in a single glass tube preserved and sterilized in liquid vaseline. These tubes may be boiled to sterilize the exterior and they can be broken open, the needle and suture removed and used as directed.

Johnson & Johnson pack these tubes three in a box. They are sold under the designation Blood Vessel Sutures—Bernheim.

---

## SYNOL HELPS TO PRODUCE CLEAN MILK

It is frequently within the province of physicians to discuss with their patients the problem of a satisfactory milk. Investigations have proven that the best milk obtainable is that which is furnished by a sanitary dairy. Then the question arises—what constitutes a sanitary dairy? There are a number of answers applicable to this important inquiry. It is of the greatest importance that the cows involved in the production of the milk must undergo examination at intervals of not more than a year for tuberculosis indications. Satisfaction being secured in that particular, care must be taken that the cow's body and surroundings shall be kept as clean as possible.

To accomplish cleanliness in every particular is a matter that requires earnest attention to details. For example, the dairyman and his employees themselves must be clean of hand; the cow's udders, all the utensils, bottles and apparatus must be thoroughly washed before each milking.

For this purpose a product known as Synol Soap is very serviceable and valuable. Dairymen in considerable numbers have been advised of it by bacteriologists and pure-food commissions.

Used intelligently and thoroughly about the dairy it will positively insure a superior quality of milk. Let the employer and employees, both the milkers and those who handle the milk, wash their hands in a 3 per cent. solution of Synol Soap (three teaspoonfuls of Synol Soap to a pint of water). The udders of the cow will be perfectly sterilized if a sponge or cloth is impregnated with this solution and the parts washed off, after which operation they should be well rinsed with clean water. The containers used in milking, the bottles in which milk is placed and all other things likely to come in contact with the milk should be treated likewise.

# Surgical Specialties

## Aseptic Dental, Surgical and Optical Napkins

**(Sterilized)**

To be used but once and destroyed.

It is known beyond question that a substance like cloth for the use of surgical specialists in eye, ear, nose and throat operations must be surgically clean.

These small napkins will be found a great convenience in this work. Put up in two grades of material and of two sizes.

| "No. 1" | | "No. 2" | |
|---|---|---|---|
| 50 in box 6 x 6 ins. | $0.25 | 50 in box 6 x 6 ins. | $0.20 |
| 500 " 6 x 6 ins. | 2.25 | 500 " 6 x 6 ins. | 1.75 |
| 50 " 9 x 9 ins. | .55 | 50 " 9 x 9 ins. | .45 |
| 500 " 9 x 9 ins. | 4.85 | 500 " 9 x 9 ins. | 3.75 |

## Napettes

(Sterilized)

A small piece of surgically clean gauze 2x6 inches for the many everyday uses where a larger piece of gauze is not needed. Folded or rolled as compress or mop. For wiping instruments, etc.

Put up 250 Pieces 2 x 6 inches in a box.....35c

## Nu Paper Pinafores (1914)

**"Cheaper Than Laundry Bills"**

We believe that in these pinafores we have a quality of material that will prove thoroughly pleasing. A heavy, soft paper of cloth-like texture, crape finish. Practically noiseless. Cut out to fit the neck and upper corners rounded. Of ample size so that they fully protect the patients' clothing. Free from lint. To be used but once and thrown away. *Always clean and white and cost less than half as much as to launder towels.* That tells the story.

Put up 100 in box, 15 x 19 inches.....per box 75c.

## LINTON MOIST GAUZE—METHOD OF PRERARATION

The preparation of Linton Moist Gauze begins with the use of a standard gauze prepared especially for this purpose in the Red Cross Cotton Mills, the standard adopted being that of about six hundred grains to each square yard, with a mesh of about thirty-two threads to the square inch. This fabric is impregnated to saturation with a definite stable solution of the antiseptic. The impregnating solution is made up with physiological salt solution instead of water. The solution is thoroughly and uniformly distributed, so that every part of the fabric is charged with an exact and uniform quantity of the antiseptic. The solutions are stable and non-volatile. The product is not subjected to drying, volatilization, atmospheric, and chemical change incident to other methods of preparation.

The various steps of the process are as follows:

1. Preliminary sterilization of the gauze by moist heat.
2. Preliminary sterilization of the glass jars in which the dressings are to be packed.
3. Impregnation of the dressings with antiseptics.
4. Sterilization of the dressing materials, containers, tops and fittings, and all other things pertaining thereto, by saturated steam in a vacuum.
5. Packing of the dressings in their containers, the covers being laid on loosely, preliminary to their final sterilization.
6. Sterilization of the finished dressings with steam. During this process the cover is hermetically sealed.

All the steps of the processes are carried out in a special aseptic room. In this room the material is kept sterilized, and the employes are specially trained for the work.

The actions involved in the sterilization chamber are:

a. Preliminary warming of materials to prevent condensation.

b. Removal of air.

c. Circulation of saturated steam, unmixed with air, under pressure, through every fiber of the material, subjecting them to the highest possible action of this agent.

d. Subsequent exhaustion of steam and substitution of heated air.

The dressings are passed into the chamber, heat is turned on; the air is then exhausted until a given vacuum is formed; saturated streaming steam is let in until the temperature reaches 240 degrees, and the pressure gauge indicates five or ten pounds. The steam pipes are then closed, and the vacuum

pump started until the proper vacuum is obtained. Again steam is turned on, and so on in turn saturations are forced through the vacuum for from one to two hours.

From the sterilizing chamber the dressings pass directly into the aseptic room.

This method of sterilization effectively destroys all possible infection and secures absolute safety against the remote possibility of infection by handling. After the final sterilization the jar seals are locked.

The experience gained since the origin and perfection of Linton Moist Gauze Dressings has abundantly proven that the principle governing their production is the only rational and scientific basis for the perfection of wound dressings.

The glass container in which Linton Moist Gauzes are packed insures perfect protection in their transportation, sale and use. The form of the glass jars admits of a portion of the gauze being removed without danger of infecting the remainder.

## THE MECHANICAL VALUE OF MEDICATED PLASTERS

### AND THEIR MANY THERAPEUTIC USES

Plasters, in addition to their therapeutic action, afford support, protection and produce automatic massage.

They prevent irritation or abrasions. They prevent infection from clothing and the air by covering the diseased surface. In the case of open sores, ulcers and the like, many kinds of plasters form a most efficient dressing.

Plasters compress and limit the motion of the underlying tissues, thereby rendering mechanical support. In this way plasters, no matter what their medication, relieve the tension, pain, redness, heat, swelling and inflammation, causing an absorption of inflammatory or non-inflammatory fluids, pus, congested blood, etc. By this action they also stimulate the normal functions and exert a continuous massage.

In weak back, for example, the application of a belladonna plaster acts as a support, resting and massaging the parts. Every time the wearer bends over, the muscles ripple under the plaster, and in addition to absorbing the medicinal properties of the plaster, the muscles are massaged.

The difference between a hand massage and a plaster massage is that the plaster acts gently but continuously for eight or ten days, or as long as the plaster is on, while a hand massage lasts only from fifteen to twenty minutes.

The massage feature of plasters is little understood, but it is one of their most beneficial functions.

The therapeutic application of medicated plasters is widespread. Recent authorities have recommended their use in a long list of inflammatory conditions, such as abscesses, inflamed joints, synovitis, varicose veins, ulcers, boils, carbuncles, orchitis, epididymitis, pulmonary, hepatic, renal and throat diseases, mastitis, inflamed joints from gout or rheumatism, pleural involvement, neuralgia, lumbago, floating kidney, excessive sweating and tuberculosis, as well as a long list of dermatological affections, such as acne, comedones, eczemas, tinea circinata, lupus, etc.

Any plaster when applied over a sore spot relieves the soreness by subduing the inflammation. In a medicinal plaster the tissues absorb the medication. The medicinal agents soothe and relieve the pain.

Dr. John V. Shoemaker calls attention to the fact that plasters are applicable on portions of the body to which powders, lotions or ointments cannot be conveniently applied or maintained in position, and that a patch of plaster on the face is less unsightly than a smear of ointment.

An important effect in plaster therapy is illustrated by a capsicum or a belladonna and capsicum plaster. On application of the plaster, heat, redness, etc., are produced, thereby diverting the flow from the morbid or diseased part towards the place where the counter-irritant action has been set up. This stimulates healthful, normal action in the tissues. Mustard and blister plasters are active examples of this class.

In addition to the foregoing there is the action of the absorbed medicament.

Thus, in rheumatism or gout, or a pain in any part of the body, with an anodyne such as belladonna, applied either directly to the part or to the region of the nerves leading to the parts, the effect is pronounced and continuous.

Caldwell says: "The action of a belladonna plaster is a thousand times stronger than when the drug is taken internally. The plaster is usually better than the liniment or ointment because:

"First, it does not soil the clothes;

"Second, it is more slowly absorbed, hence its action is more continuous;

"Third, it protects the skin from cold, and in that way relieves pain;

"Fourth, it acts as a splint, lessening the mobility of the painful area.

"No drug in Materia Medica is such a powerful depressant of glandular activity and none has a wider field of usefulness in local treatment of the various ailments of the body."

The strongest argument you can offer a sceptic for the use of a plaster is this: "If you have rheumatic pains in the knees or any other spot it is quite natural that if you can apply the medicine direct to the knee and the joints the effect of the medicine will be much stronger. And applying a plaster to the knee instead of taking the medicine through the stomach to reach the knee

is the most direct way of getting the medicine to the affected part. When a plaster is applied over a rheumatic spot the medication is absorbed by the skin and goes directly to those tissues which are affected."

The arguments in favor of the use of plasters in acute and chronic inflammatory conditions are incontrovertible. The strongest proof of their usefulness, however, is the fact that success invariably follows their application.

## FIRST AID TO EXPECTANT MOTHERS

Physicians have long noticed the fact that lack of knowledge on the part of the patient has made labor difficult and dangerous. It is impossible for the practitioner to be always at hand to answer questions and give advice during the period of pregnancy. Some physicians have written out instructions and given them to their patients, but this process possesses obvious disadvantages.

To satisfy a demand of long standing comes the booklet "Hygiene in Maternity" from the Scientific Department of Johnson & Johnson. Compiled from the chief authorities on obstetrics, it contains all the information which the physician would wish his patient to have, but which as a rule he has not time to give her. "Hygiene in Maternity" is in no way intended to supersede the advice of the physician; it forms a welcome and necessary adjunct to his services. It is therefore natural that so many members of the medical profession have secured copies of this book—which is sent free of charge for the asking—and have given copies of it to all the expectant mothers on their list.

Rules for calculating the time of birth, a list of the signs of pregnancy, directions for the exercise, diet and general care of the patient make this a book which every doctor will want to put in the hands of his patient. Many a disastrous accident, many a tragedy, perhaps, may be averted by the presence of this work in the household. Sane, accurate advice, simply and clearly expressed, touches every point from the first signs of pregnancy to the care of the infant. The publishers do not claim to have produced a text-book on obstetrics or a "family physician" to supplant regular medical care, but they claim to have produced a manual of simple advice which will prove of service to every expectant mother. And an examination of the book proves their claim well founded.

## PRACTICAL SUGGESTIONS

Don't squeeze the pus from an infected part. Frequent dressing and natural drainage accomplish all that is needed.

Don't forcibly tear off an adhesive plaster. Saturate a wad of cotton with alcohol; it will soften the mass—the rest is easy and painless.

The best treatment for a sprained ankle is an adhesive plaster dressing. Don't fool with liniments.

Sterilize the hands after every suspicious examination. Do it with Synol Soap; it is for your protection and for that of your next patient.

The natural oil and grease on the skin sometimes prevent adhesive plaster from adhering. Cleansing the skin with ether, benzine or alcohol will facilitate it.

Rubber adhesive plaster often causes dermatitis—use "Z O" Plaster and you will have no such trouble.

# The Band

**Linton Gauze Bandages in Cylinde**
**tridge carton. Sterile, clean, fit to ap**
**in the grip or pocket.** Perfectly pr

Made in Surgical Dressings Laboratory of finest grade gauze, well spun yarn, tightly rolled, raveled edge, full width and length.

**The most useful strip of**
**sizes run from the Finger**
**finest surgical bandages ma**
**Gauze Bandages.**

ch bandage tightly sealed in car-
irect to the wound. Can be carried
d from infection in handling.

This style of packing, used only on Linton Gauze Bandages, keeps the bandages aseptic indefinitely. Costs only a trifle more than the common kind.

known in the world. The
ge up to four inches. The
In ordering specify Linton

## HEALTHY AND CONTENTED OPERATIVES

The operatives of Johnson & Johnson form a fair-sized community in themselves. Johnson & Johnson have long realized that only bright, clean, healthy people could prepare surgically clean dressings, and thus business interests as well as the welfare of the employees have caused them to make the work of the factory pleasant and healthful.

Packing room for surgical dressings. Polished floor, metal ceiling, glass enclosure to prevent the access of dust and dirt.

Recently the National Civic Federation requested a description of the factory and some points connected with the welfare work of the employees of Johnson & Johnson. From this report the following account has been made up:

The buildings where operations are carried on are built on scientific lines. The factories are located on the banks of the Raritan River at New Brunswick. The buildings, which are well lighted and well ventilated, are surrounded by spacious lawns and gravel and cement walks. The most of them have been specially constructed for the work to be performed therein; the older buildings have been rebuilt to conform to the general plan. Ample provision is made in all parts of the factory for cooling the portions of the factory where it is necessary to maintain a high temperature. In no part of the work is there offensive gases evolved.

In the departments devoted to the manufacture of cotton and surgical dressings there are ample devices for exhausting flying fibers and dust. In certain parts of the factory the work of the operatives is in rooms surrounded by glass partitions, which by special devices for ventilation are kept absolutely dustless. The buildings are lighted by electricity supplied from the central power plant of Johnson & Johnson. The operatives are protected from injury by the machinery, every conceivable device being employed to prevent the clothing of the employees from catching in the same. Attached to the main engine is what is known as the Monarch Engine Stop. The machinery is electrically driven by individual motors.

Every department is furnished with complete dressing rooms and lockers of modern construction.

The employees wear special uniforms throughout the departments.

There has been installed a system of lavatories which is above the ordinary; the basins are constructed of white enamel with modern plumbing with a view of insuring perfect cleanliness. A corps of people are employed to keep the grounds and work rooms scrupulously clean. All of the buildings are completely equipped with fire escapes and duplicate stairways. There is also an automatic fire sprinkler system, and fire buckets which are distributed at

different points; in addition to this there is an organized fire department to whom is assigned the duty of conducting the employees to a place of safety in an emergency.

Lunch rooms have been provided. Many of the employees work at night and special provision has been made for them by the installation of a kitchen in charge of a competent chef who, at midnight, furnishes the employees with soup and coffee free of charge.

tended to here, and the unsatisfactory method of treating cases in the work room is avoided. These rooms are fitted up with lounges, couches, easy chairs and such appliances as are necessary for the care of patients. If the injury or illness is at all severe the patient is placed in charge of a medical attendant or his own family physician. All treatment is governed by strict regulations. The intention is to apply first aid only. The treatment is in charge of

Desk of forewoman, centrally located in the room for packing cotton, etc.

All departments of the factory are supplied with filtered water in specially made coolers which prevents the ice from coming in contact with the water. The ice is made on the premises. This system has been found to be a source of great satisfaction during the summer months, and the employees have been remarkably free from complaints prevalent at this season of the year.

Two hospital and retiring rooms are provided for the employees in case of illness or injury. These rooms are also utilized for resting purposes. These hospital rooms have been specially built and outfitted on the modern hospital plan. All cases of injury or temporary illness throughout the factory are attended to by those who have been previously trained in first aid work and who have the assistance of a competent physician and nurse employed by the Visiting Nurses' Association.

In conjunction with the Hospital Department is the Aid and Relief Department, whereby the foreman and forewoman in charge of the department reports immediately all cases of sickness, contagious as well as non-contagious, which may be present in the household or on the premises of any employee. The names of employees who do not seem to be in good health are also reported. Cases thus reported are investigated by the aid of a physician or the Visiting Nurse and, when

necessary, medical and hospital treatment is provided. This department has been very efficient in caring for cases of contagious disease and in preventing the spread of such diseases in the families of employees, and by assisting consumptives and others. In such instances employees have been sent to

Sanitary wardrobe.

homes and resorts for rest and recuperation. This Department has been found of great value both to the employees and the work of Johnson & Johnson. Particular care is given to the investigation of any contagious malady, it being manifestly important that no sort of contagion be allowed on the factory premises. All operatives before employment are required to show a certificate of successful vaccination. Periodically all operatives are vaccinated by physicians employed by the corporation. The welfare of the employees is also carefully looked after in other directions.

A Saving Fund has been established in which employees may deposit their savings, receiving full interest on the same, such a fund being secured by bonded investments subject to return on call. Plans are being arranged which seek to provide insurance pensions for long services, old age, death, etc., and loan funds for building purposes.

A swimming pool built along very modern lines has been installed for the use of the operators. In connection with this pool there is a series of shower baths, tub baths, etc. The baths are supplied with hot and cold water and Synol Soap.

The social well being of the employees is also looked after. The female employees are organized into a club known as the Laurel Club. This club is provided with a room in which to carry on their work. The club is social as well as educational and many dances, entertainments, etc., have been held under the auspices of the club. At the present time classes are conducted as follows: Hygiene, Dressmaking, Physical Culture, Cooking, Housekeeping, First Aid to the Injured, Gymnastics, Swimming and Dancing.

There has also been organized an association for the men—the Johnson & Johnson Athletic Association. The object of this association is to encourage manly sports and to promote physical

culture. In season a series of baseball games is played. This summer past the Johnson & Johnson Association scored second in the Factory Baseball League of New Brunswick. Complete baseball outfits were supplied by the corporation. During the winter months members of the Association enjoy indoor sports in the gymnasium, such as indoor baseball, basketball, etc.

The welfare work of Johnson & Johnson has not been conducted upon any elaborate plan, but is rather such as may have been suggested from time to time during the course of the organization of the business. At the present time steps are being taken whereby the whole of the welfare work will be collected upon a coherent plan; this will amplify the methods already employed.

These measures have been carried out in the belief that the surest way to success is through healthy, happy and contented operatives, and has secured Johnson & Johnson a corps of trained people for the improvement and perfection of their products.

Lavatories for operatives. These lavatories are distributed throughout the entire factory buildings. Made with open plumbing, supplied with hot and cold water, Synol Soap, etc.

## SYNOL SOAP

### ITS USE IN SURGERY

Synol Soap is a product which answers every requirement for the perfect sterilization of hands, instruments and operative field without irritation to the skin surface or injury to the most delicate instrument.

The harsh and skin-roughening antiseptics which have been employed for sterilization of the surgeon's hands, injure the epidermis and produce a condition which is, to say the least, very uncomfortable.

Synol Soap properly employed will effectively and positively sterilize the hands without the addition of any other antiseptic. Scrubbing with a nail brush and Synol Soap for five minutes and rinsing with sterile water has unfailingly rendered the skin surface sterile and

First—Does not irritate or roughen the skin,

Second—Keeps the skin soft, pliable and clean,

Third—Preserves the integrity of the epithelium,

Fourth—Sterilizes the operative field by scrubbing with a good brush or a wad of gauze and rinsing off with sterile water.

Synol Soap will sterilize instruments no matter how infected. They should be first washed thoroughly with Synol Soap and a brush or a wad of gauze and then boiled for five minutes in a 2 per cent. solution of Synol.

# How Synol Kills Germs

Synol can be used in a baby's bath yet it has a remarkable germ destroying power. Here is the proof:

The United States Public Health and Marine Hospital Service has devised a method for standardizing disinfectants. It is a very precise method and has been universally adopted.

Synol has been standardized under this method with the following results:

Germ Killing Power of Synol

Synol diluted 1 to 200 (½ per cent solution) kills anthrax bacillus in 50 seconds.

Synol diluted 1 to 150 (three-quarters of one per cent solution) kills anthrax bacillus in 20 seconds.

Synol diluted 1 to 100 (one per cent solution) kills staphylococcus aureus in 50 seconds.

Synol 1 to 20 (five per cent solution) kills typhoid bacillus in 50 seconds.

Under strict laboratory tests Synol in diluted solution of from one per cent to five per cent kills resistant disease and wound producing organisms in from 20 to 50 seconds.

In practice Synol Soap is used in dilutions of from one to ten per cent.

Synol action is so marked because it softens and dissolves dirt, grease and scale in which bacteria are imbedded and allows the germicide to act.

We will send you a bottle to test for yourself.

## THE THERAPEUTIC VALUE OF BELLADONNA PLASTERS

Having told you *where* Belladonna acts to deaden pain, we will endeavor to tell you *why* its anodyne action is many times stronger when applied at the seat of pain than when given internally.

If a drug acts as an anodyne by depressing the sensory ends it is far better to apply it directly at the seat of the pain if it is accessible. It has a much stronger action because the whole dose in concentrated form comes directly in contact with the ends of the nerves that are irritated, whereas, if it is taken internally the dose is diluted by being mixed with the whole quantity of blood and carried equally to all parts of the body. Just as in asthma, smoking the belladonna leaves benumbs the sensory ends in the respiratory mucous membrane and lessens the reflex bronchial spasm.

Belladonna plaster applied to the skin is most efficient in relieving the pain of lumbago. Belladonna relieves the irritability of the chest muscles in cases of congestion. It has a special action on the pain arising from old adhesions due to pleurisy. In addition to being an anodyne it also serves as a splint, thus lessening the mobility of the chest wall. In the same manner does it benefit the pain in gout and rheumatism.

Belladonna diminishes muscular spasms. When a drug lessens spasms it is by depressing some part of the motor mechanism and is indicated by the following actions: First, on the cerebral motor area, the spinal motor area, the spinal motor tracts, the ends of the motor nerves and the muscles.

It is known that belladonna applied to the skin depresses the ends of the motor nerves so that impressions cannot be conveyed to the muscles, but are stopped just before reaching the muscle, and hence belladonna in this way can relax spasm. For the same reason it is far

A pleasant spot under the windows of J. & J. factories. The factory grounds are clean and dustless.

more efficient as an anodyne when applied locally.

Belladonna is a well known and powerful depressant of the glandular secretions. Its physiological action is:

First, the ends of the tender nerves whose function it is to excite secretions reflexly;

Second, the center in the medulla, whose functions are both automatic and reflex;

Third, the ends of the various efferent nerves distributed to the glands;

Fourth, the secreting cells.

Nothing better can be applied to the mammary glands than a Belladonna Breast Plaster when it is desired to dry up or check the secretion of the milk. It is far superior to remedies given internally because it diminishes the secretion without producing other action on the system.

Belladonna depresses the peripheral point of nearly every nervous mechanism, hence it has a wider field of usefulness in local treatment of the various ailments of the body than any other drug in the Materia Medica.

A medicated adhesive plaster is valuable as a protective for the reason that the adhesive properties contained in the plaster are valuable in irritated and sensitive surfaces of the skin where pain has located.

They act as a protective dressing, preventing irritation.

They serve to keep an even degree of temperature of the body where applicable.

Plasters compress and limit the motion of the tissues, likewise give support. In this way plasters relieve the pain, redness, swelling and inflammation, thereby causing the absorption of the inflammatory and non-inflammatory fluids, pus, congested blood, etc.

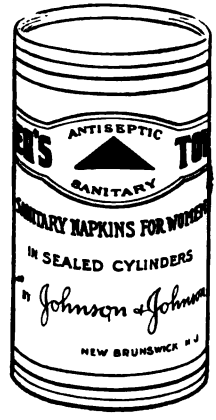
By this action of compression and limitation of motion and support plasters stimulate the normal functions and thus give a continuous massage.

In the case of weakness of the muscles, as in the back, the application of an adhesive plaster acts as a support, rests and massages the muscles.

An important feature regarding the dependence to be placed in a belladonna plaster is that the belladonna should be a true belladonna of assayed, standardized strength, combined with resin and gums of known medicinal value.

## NEW PACKAGE FOR LISTER'S TOWELS

The popular Lister's Antiseptic Sanitary Towel, found so available during the years of its manufacture and sale, is now supplied in a new form of container. In this package the towels are enclosed in a cartridge cylinder of the same form




as that used in enclosing and sealing Linton Gauze Bandages which has proved so successful. One of its present advantages is that its bulk is reduced to a minimum, thereby being more convenient for traveling. Lister's Antiseptic Sanitary Towels are made of the best materials and are exceptionally absorbent.

---

## THE ACTION OF RADIUM RAYS ON BACTERIA

Some writers have recorded observations to show that various forms of bacteria, when exposed to radium rays, suffer a reduction in color and virulence and show an increase of involution forms.

Recent work has been undertaken in Guys Hospital, London, as to the action of the rays upon the bacillus of anthrax, pyocyaneus, subtilis, coli, typhosis, and various other organisms.

The results seem to show that under exposure of an hour, and in some instances longer periods, the rays have no perceptible effect upon the capacity for growth, reproduction, mortality or staining reactions.

# Special Literature

The pamphlets named below are recent issues of the Scientific Department of Johnson & Johnson. While their primary purpose is to give information about our products, they cannot fairly be classed as advertising matter, as they are scientific monographs thoroughly deserving of the perusal of all interested in medicine, surgery or pharmacy. They are sent free on request.

No. 280. "Therapeutic Uses of Adhesive Plaster." A monograph of twenty-two pages, illustrates and describes the uses of Adhesive Plaster in the treatment of injuries and in disease. Useful to practitioners, students and nurses.

No. 226. Handbook of Ligatures. This pamphlet contains a complete and interesting recital of the methods used in preparing catgut. It also contains a description of the sizes, tensile strength and other particulars of the finished ligatures. It is illustrated with photographs.

No. 20. Physicians' List. This is an elaborately illustrated catalogue of the most important products of Johnson & Johnson, described and arranged with an index for the convenience of customers. It proves valuable at ordering time.

No. 41. Hygiene in Maternity. Contains in clear and concise form such information as the physician desires his obstetric patient to have at hand before and after confinement.

## CONTAGIOUS DISEASE BULLETINS

Johnson & Johnson issue a series of bulletins each dealing with one of the most prevalent contagious diseases. Each bulletin gives simple information as to isolation, disinfection and general care. These bulletins have been found of great value during epidemics, and many health boards have ordered large numbers for distribution in infected communities.

Any single bulletin is sent free on request. The complete set, neatly bound together is sent on receipt of a two cent stamp.

No. 29. Typhoid Fever.
No. 39. Scarlet Fever.
No. 40 Measles.
No. 43. Whooping Cough.
No. 28. Diphtheria.
No. 56. Consumption.
No. 57. Smallpox.
No. 38. Meningitis.

No. 18. A book with a Mission. This is a simple resume of the rules which should be followed by the citizens of communities in which infectious diseases are prevalent. It is intended for general distribution by health boards and charitable organizations.

---

## SYNOL STOPS ITCHING IN SMALLPOX

We have had quite a number of smallpox patients and they like to use Synol. A little of it in water used for sponging allays the itching.

Yours truly,
F. E. FLETCHER, M. D.
Ashland, Wisconsin.

## WHY A BELLADONNA PLASTER IS A TRUE THERAPEUTIC AGENT

*It is an important law that the vaso-motor nerves supplying the skin are always associated with the vaso-motor nerves supplying organs or tissues underneath that part of the skin. This law explains the whole subject of surface application.*

A plaster or poultice, for example, is always sedative in its effects and relieves internal pain, not because the medication strikes clear through into the organ involved, but acts only on the vaso-motor association between the outer and inner parts. Hence we may allay pain, stimulate as well as depress, by this association.

*Every inflammation of an internal organ causes the vaso-motor nerves of the skin over that organ to be in a highly sensitive condition, so that the internal inflammation may be much aggravated by neglect to protect that part of the skin.*

This is particularly illustrated in inflammation of the heart, which may be made much worse by having the skin over the heart exposed to the cold.

Besides these laws of vaso-motor associations there are other associations between widely separated parts.

Thus the feet are closely associated with two important regions, the organs of the pelvis and the throat. Hence getting the feet wet will have an immediate effect upon the circulation of these parts and may result in sore throat, bronchitis, bladder inflammation, uterine disorders, etc.

Bearing in mind that internal inflammation causes great sensitiveness of the corresponding area of the skin over the seat of the inflammation, an area of inflammation should have the corresponding cutaneous surface carefully protected. We now arrive at the point in value of the application of an adhesive medicated plaster at the seat of pain.

Belladonna is the foundation of every good plaster recommended as a pain-allaying agent. Belladonna stimulates capillary circulation by its decided influence upon the vaso-motor centers and nerve peripheries.

Belladonna is the most powerful and the best known pain-allaying drug.

Dr. W. C. Caldwell states that when belladonna is applied locally to the skin in plaster form it acts upon the following mechanisms of the human body:

First, the sensory mechanism;
Second, the motor mechanism;
Third, the secretory mechanism;
Fourth, the ocular mechanism.

Belladonna relieves pain and is far more efficient when applied locally than when given internally. By lessening pain it depresses some part of the sensory mechanism by the following action:

First, the receiving center in the brain;
Second, the sensory tracts in the spinal cord;
Third, the ends of the sensory nerves.

Views in the Ligature Laboratory of Johnson & Johnson.

# Synol in Typhoid

One of the most important uses of Synol Soap is in the sick room—in typhoid, for example. The danger from soiled hands and clothing, to the nurse and to the physician, is always present. A bottle of Synol Soap in constant use can be depended upon to destroy the typhoid organism. A three per cent solution of Synol Soap kills the typhoid bacillus in two minutes. Of course this is a bacteriological laboratory report and it is often stated by physicians that in practice, materials are not used under the clean pure conditions of the laboratory. That is correct, but note this: Synol is a soap, and soap emulsifies and mixes with organic matter, such as feces, etc., thus allowing the germicidal action to take place.

Entirely aside from its cleansing value, Synol Soap is a remarkable germicide.

The combination is irresistible.

Equally efficient in other diseases and for the surgeon's hands.

Corner of First Aid and Rest Room, J. & J. factories. Many factories now install such a room where injured and ill operatives can receive immediate aid. They can be installed simply and without great expense.

## SPOOLS OF ADHESIVE PLASTER
### IN CONVENIENT NARROW STRIPS

The small, narrow strip of "Z O" Adhesive Plaster has its most frequent use in surgery. The small wound of the extremities or face which may be approximated with a strip of "Z O" Plaster occurs more often than a fractured rib or clavicle.

There is no end to the use to which a narrow strip of adhesive plaster may

be put; a handy spool of this plaster containing about seventy yards of "Z O" Plaster one-eighth of an inch wide will be found invaluable in your office or operating room. It will hold a small bandage in place; it will coapt facial wounds; small incisions can be drawn together, making sewing unnecessary and preventing scars. The small strip of "Z O" Plaster is very pliable, conforms to the contour of any part without wrinkling and is non-irritating. It will make a fine supportive dressing for a sprained finger; it will hold a small splint in place; in fact, hundreds of uses will suggest themselves in your daily work.

Every surgeon will realize the inestimable value of these small strips, which were originally gotten up for chiropodists, having learned from experience that the cutting of small pieces from a wide roll is both bothersome and wasteful.

## THE MUSTARD PACK IN BRONCHITIS IN CHILDREN

Dr. A. A. Herzfeld, in the Journal A. M. A., says that while mustard has been in use as a counter-irritant for many centuries few physicians are acquainted with its excellent effects in the treatment of capillary bronchitis and bronchopneumonia in infants and children. It is especially indicated when such dangerous symptoms as severe dyspnea, asphyxia, cyanosis and great general prostration arise.

Dr. Herzfeld applies it in the form of spread mustard mixed with alcohol. Flannel is saturated with the mixture and the body of the child wrapped up from the neck to knees. The moistened flannel is then enveloped in a dry sheet and the child is left in this pack until the skin is bright red. This point is usually reached at the end of fifteen to thirty minutes. The child is then taken out and wrapped and left for another half hour in a pack moistened with a mixture containing one part alcohol and two parts water. At the end of this time the child is wrapped up in a dry sheet. In most cases one well applied mustard pack will suffice to bring about a permanent improvement. It is not advisable to apply the pack more than once in twenty-four hours unless the indication is unavoidable. The effects of this mustard pack on a child are striking.

A mustard pack can also be applied by the use of the prepared mustard plasters. In this case it is best to use the half-strength, wetting them well in water and covering with flannel, allowing them to remain until the skin is reddened. This will occur sometimes at the end of five or ten minutes. The flannel may also be moistened in the water in which mustard plasters have been soaked from twenty minutes to a half hour. In this soaking the oil of mustard is evolved and saturates the water. About six mustard plasters to four fluid ounces of water give a counter-irritant of sufficient strength.

---

—The hands and face are washed many times a day, the head seldom more than once a week. Yet the hairy scalp is especially favorable as harborage for dust and dirt. Surely, therefore, a daily washing of the scalp and hair is imperative.

## THE PREPARATION OF ABDOMINAL SECTIONS AND PLASTIC OPERATIONS AND THEIR ROUTINE AFTER-CARE.

*(Special Contribution)*

By JOHN COOKE HIRST, M.D.

When sufficient time can be allowed, the patient is kept in the hospital and in bed forty-eight hours before the time set for operation. All urine, blood, heat and lung examinations can be completed during the first twenty-four hours of the stay, and the last period devoted to the actual local preparation. An estimation of the clotting time of the blood is made in every case, especially those whose hemoglobin is sixty or below.

4 P.M. of day before operation: Abdomen shaved, pubis, labia and upper third of thighs shaved completely, abdomen scrubbed with green soap, hot sterile water and either gauze pads or a soft brush for ten minutes, rinsing the suds off frequently. The nurse who does the scrubbing prepares her hands and wears rubber gloves as at the operation itself. After soap scrubbing, the skin is treated with eighty per cent. alcohol, dried with a sterile towel, and a dressing of dry sterile gauze is applied and held in place by a binder covering the abdomen and thighs, so arranged that it cannot be displaced upwards and expose the cleansed area.

Sterile Rubber Dam in position on abdomen before being stitched to skin.

6 P.M.: Soft diet for supper.

9 P.M.: Magnesium Sulphate. If patient restless or nervous—Veronal.

7 A.M. day of operation: Cup of beef tea with two or three crackers.

10 A.M.: Scrubbing of previous day repeated (except the shaving) and a dry dressing of one per cent. formalin solution is applied and the binder arranged as before. Lower bowel cleansed out by enema.

Three-quarters of an hour before operation Morphin Sulph. and Atropin Sulph. administered unless some special contra-indication is present. Catheterize just before the beginning of the anesthesia.

Sterile Rubber Dam stitched to skin and incision made through dam.

On the operating table the patient receives a final wiping of the skin with Thymol in alcohol. The abdomen is covered with a sheet of boiled rubber dam, through which the incision is made, and the edges of the dam are sewed down into the wound, so that no skin is visible; one silk-worm gut stitch in each side is enough. The operative field is prepared as usual with sheets and towels.

Iodine is not used for several reasons: (1) In strengths of less than twelve per cent. it will not sterilize the human skin and that strength will cause severe des-

quamation; weaker solutions are not to be depended on. (2) It is an intense irritant to the peritoneum, and contact with it cannot be avoided in an abdominal operation. It will cause extensive adhesions and has caused fatal intestinal obstruction. (3) The healing of the wound is not uniformly clean, as it is with other methods of preparation.

When time is limited, as in acute appendicitis, extra uterine pregnancy, the second scrubbing, with shaving, is dispensed with. When the abdomen is too sensitive to scrub a thick layer of gauze saturated with tincture of green soap is put on for two hours, the skin wiped off with alcohol and a dressing of formalin applied. When even this time is not available the scrubbing is carried out on the table, under ether, and the skin covered by the rubber dam.

Exploring through skin protected with Rubber Dam. No danger of dragging infection into wound.

Proper method of tying catgut, using the thumbs close to the knot.

Preparation for a plastic operation is less complicated.

Day before operation—

6 P.M.: Light supper.

9 P.M.: Magnesium Sulphate.

Day of operation—

7 A.M.: Cup of beef tea and two or three crackers, repeated till fluid returns absolutely clear. Last enema at least three hours before operation.

10 A.M.: Pubis and labia shaved. Vulva washed. Vaginal douche of bichloride of mercury (1-2000). Paregoric given by the mouth one hour and a half before operation. A vulva pad applied, and the patient catheterized just before anesthesia.

On the table: Vulva and vagina cleansed as before. Depilatories are not used. Clipping of the pubic hair instead of shaving is not sufficient.

All supplies, dressings, etc., are steam sterilized, basins and pitchers boiled. Tables are covered with sterile rubber sheeting, and sheets or towels on top of this.

The catgut used is the manufacturer's prepared gut put up in tubes and boiled with the instruments. The home preparation of catgut is dangerous and is sure, sooner or later, to end in disastrous infections. Silk and Pagenstecher thread are sterilized with the dressings; silk-worm gut and silver wire are boiled with the instruments.

As a preventive of wound infection, it must be remembered that chromic catgut larger than No. 1 size cannot safely be buried in the abdominal wall.

Surgeon's hands are sterilized by ten minutes' scrubbing with hot water, tincture of green soap and a brush, two minutes in alcohol, eighty per cent., rinsed in bichloride of mercury (1-1000). Caps,

masks, gowns and dry sterilized gloves worn in every operation. The washes are omitted in plastic operations.

In sections gauze sponges in packs are used. In plastics sea sponges are better than gauze.

ROUTINE AFTER-TREATMENT

Sections—Water in small quantities as soon as ether nausea ceases, morphine and atropine if needed. The bed is elevated at the head for first forty-eight hours. An enema of milk of assafœtida given at the end of twenty-four hours, and the rectal tube used p. r. n.

Calomel followed by magnesium citrate after forty-eight hours.

Diet—Water for first twenty-four hours, alkaline water, broths.

Hot milk for next forty-eight hours, soft diet after third day, medium diet after seventh day and full diet after tenth day.

Kept in bed for fifteen days, except hernias and operations for retroversion, which stay for twenty-one days.

Stimulation, when needed, heat entrolysis, hypodermic, rarely intravenous.

Drainage cases have Fowler position and Murphy entrolysis for first forty-eight hours at least.

When urine output is far below normal, Spartein Sulphate is given. Catheterized p. r. n.

In cases when the wound is sealed with gauze and collodion, the outer dressings are removed after six hours and an ice bag applied directly over the collodion dressing for the first three days.

Routine care of plastic:

Water p. r. n. as soon as nausea ceases, morphine and atropine as required.

Catheterized p. r. n.

Vaginal pack removed after twenty-four hours.

Perineal stitches irrigated four times daily with sterile water, also after each urination or bowel movement; if discharge collects around them, Hydrogen Peroxide cleans them quicker than anything else.

Bowels moved as in a section.

Diet, soft till bowels move, then medium till seventh day and then full.

Stitches taken out on twelfth day, and patient up on fourteenth day. Complete tear stitches are left in sixteen days, and bowels kept liquid from the start.

## A PROTECTIVE RUBBER MESH DRESSING

FOR BURNS, SKIN GRAFTS AND OTHER WOUNDS

The greatest hindrance to proper healing of burnt surface or the "taking" of a skin graft is the irritation produced by the necessary and frequent dressing. Adherence of the dried gauze fibers to denuded surfaces and to the tiny grafts causes separation of the new cellular growth from the underlying tissue and pulls the graft from its base. Besides being painful this is very annoying. The essential features in repair of burnt surfaces are protection, proper drainage, non-irritation and clean dressings.

At the suggestion of Dr. H. H. Sinclair, of Walkerton, Ontaria, Johnson & Johnson prepared a pliable, rubber-coated net cut in pieces of one square foot, packed in envelopes and absolutely sterilized. This Rubber Mesh is, up to the present, the most ideal adjunct to the dressings for burns, wounds and skin grafts.

The Rubber Mesh overlying the skin surface and underlying the dressing permits perfect drainage through the meshes, prevents adherence of the gauze fibers to the wounded surface and makes re-dressing painless.

Every physician will realize the importance and usefulness of this device. It is but reasonable to recommend this Rubber Mesh protective for all wounded surfaces, such as skin incisions, vaccinations, ulcers, bed sores, etc., in fact for all cases which require the application of dressings and bandages.

As a covering for nasal and vaginal tampons and rectal drainage tubes its employment at once suggests itself and there is no doubt that the inventive and studious mind of the physician will discover a great many more advantageous uses.

---

When you "strap" an ulcer with adhesive, be sure you do not have too much tension on your straps—even "Z O" plaster may cause blistering when so applied. and always leave apertures through which secretions may escape.—*American Journal of Surgery.*

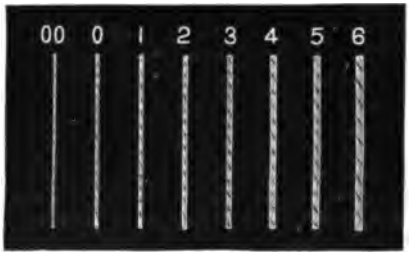
## SIZES OF SURGEONS' SILK AND CATGUT

It occurs now and then that surgeons in ordering silk and catgut sutures or ligatures confuse the sizes, with the result that upon their receiving what they specified they do not get what they wanted.

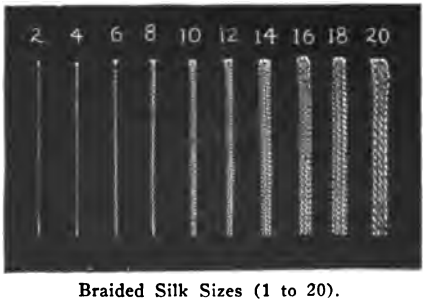
Early in their career, Johnson & Johnson recognized the confusion resulting from the manner in which different makers and dealers numbered these items relative to their use. There was no standard by which a buyer could intelligently specify by number and know what he would get.

Finally becoming leaders in the line of suture and ligature materials, we have produced this standard.

There are twenty sizes of both twisted and braided silk; No. 1 is the finest and No. 20 the coarsest. Nos. 5, 9 and 12 of twisted silk and Nos. 4, 7 and 10 braided silk are the sizes most frequently used by surgeons and these are the only sizes carried in regular stock. Other sizes must be made to order from the raw material which we always have in stock.



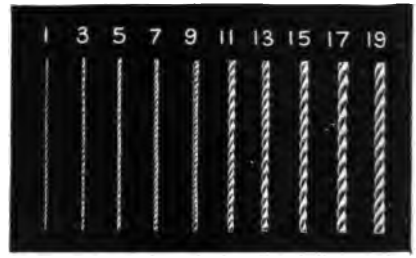

Catgut Sizes.




Braided Silk Sizes (1 to 20).

Catgut ligatures and sutures are furnished in sizes Nos. 00 to 7. The No. 00 is twelve-thousandths of an inch in diameter, the No. 0 fifteen-thousandths of an inch.

It is in accordance with these numbered sizes illustrated on this page that Johnson & Johnson's ligatures and sutures are made and sold. This firm, who are well known manufacturers of surgical dressings and supplies, have devoted many years to the perfection of ligature and suture material. Their production has a wider distribution than that of any other maker. A larger variety of different sorts of containers are used in which the various styles of these goods are packed. Each and every package contains absolutely sterilized and aseptic material.




Twisted Silk Sizes (1 to 20).

In order that any physician or surgeon may constantly have before him the exact numbers and sizes of silk and catgut, and thus be enabled to order precisely what he wants and get exactly what he orders when he specifies J .& J., we will send him a size card carrying strands of all the twisted and braided silk and catgut herein mentioned. One of the cards will be mailed postpaid upon receipt of request.

---

## BED BUGS AND DISEASE

Bed bugs are known to convey smallpox and tuberculosis. It is thought that they also convey intermittent fever and cerebro-spinal meningitis, and the supposition is in process of investigation. It has been found that these parasites attack dead and living mice, and it is thought that they spread pest and mouse septicema.

## The Ideal General Practitioner

HE is virile by virtue of his environment; he is self-reliant from his isolation; he is resourceful from necessity; he exalts common sense above fine theories; he deals with all conditions and preserves a breadth of vision, grasps general principles, and failing the finer technical knowledge of the specialist, is spared the distortion of his perspective. He knows his patient as a man and a friend and not as a commodity, and he it is who exemplifies best and most consistently that unselfish regard for others that glorifies medicine.—*Meara in Boston Medical and Surgical Journal.*

One of the sources of water supply for the Red Cross Cotton Mills. All of the water here used is treated and rendered chemically and bacteriologically pure.

# STERILE LIGATURES

## Glass Tubes

Sealed glass tubes containing the ligature preserved in the sterilizing liquid.

### Large Size Tubes

Containing ten feet of catgut, or four yards of silk.

### Standard Size Tubes

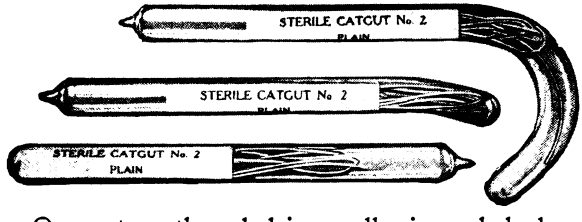
Each tube contains five feet of catgut, or two yards of silk.

Silkworm-gut, Kangaroo Tendons, Horse-hair and Umbilical Tape are also put up in Standard Tubes.

### Half-Meter Tubes

Each tube contains 20 inches of catgut or silk.

### Emergency Tubes




One suture threaded in needle, in sealed glass ready for use. Straight, half-curved, and full-curved needles supplied.

## SYNOL SOAP

ITS USE IN OBSTETRICS, GYNECOLOGY AND GENERAL PRACTICE

No greater fertile field for infection exists than the vagina in pregnant and parturient women. A vaginal examination, ante-partum, during delivery, or post-partum, must be conducted with every antiseptic precaution.

An absolutely safe procedure is to scrub the examining hands for five minutes with Synol Soap and brush and then carefully cleanse the vulva and labia with a pad of gauze saturated with Synol Soap and rinse off with sterile water. Lubricate the examining fingers with pure Synol Soap and everything is ready for an antiseptic procedure.

For post-partum irrigation nothing is as soothing and non-irritating as Synol Soap, one teaspoonful to a quart of water. There is no danger of absorption of toxic products when you use Synol Soap.

The cleansing of the pudendum with Synol Soap on a pad of cotton or gauze before applying the perineal pad is good practice and keeps the field clean and odorless.

Synol Soap is just as harmless and cleansing for the baby's skin as it is to mucous membrane; therefore washing the baby with Synol Soap after delivery is highly satisfactory. Synol Soap has a dissolving effect upon the vernix caseosa, thus facilitating the cleansing process without unusual scrubbing and rubbing of the delicate skin.

Synol Soap is very useful for gynecological work; as a finger and instrument lubricant it has no equal and will be found very satisfactory in infected conditions.

As a vaginal douche in leucorrheal discharges or gonorrheal conditions it is exceedingly effective, a teaspoonful to one quart of hot water proving sufficient to cleanse the area.

There is no limit to the usefulness of Synol Soap in general practice. Wherever it is desired to attain a perfectly clean surface its employment is indicated.

In scalp diseases, seborrhea, etc., it has a softening effect on the crusts and scales; in skin diseases where preliminary washing is not contra-indicated, scabies, etc., it is excellent; as a mouth-wash, in sore throat, tonsilitis, etc., it is healing and antiseptic. In fact, many conditions and uses will suggest themselves wherever it is evident that real cleanliness is part of the cure.

Boiler Room, Red Cross Cotton Mills. All the machinery is electrically driven.

# Red Cross Cotton Mills

The buildings for the manufacture of Red Cross Cotton and Gauze were erected in 1900. This plant is a unique manufactory.

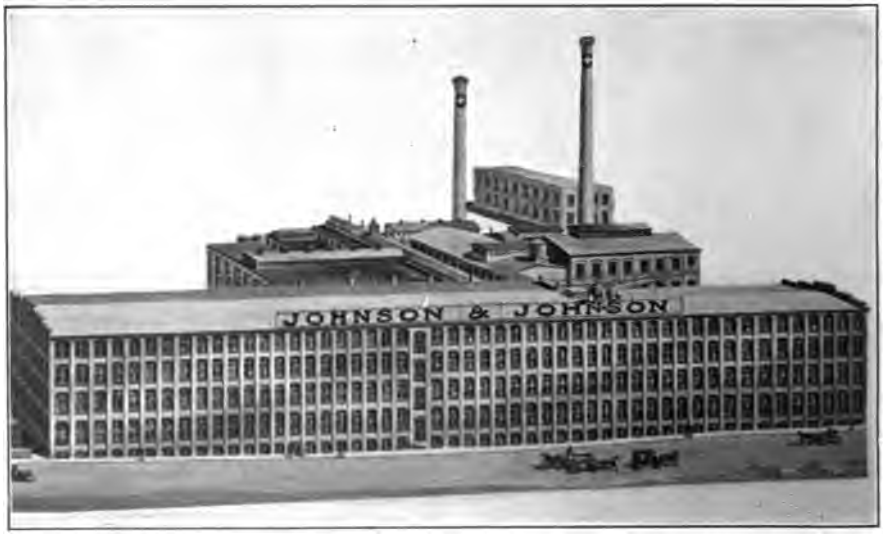
Previous to the erection of these mills Johnson & Johnson purchased finished gauze and other materials and then packed them for surgical uses.

Now, since 1900, the Red Cross Cotton Mills turn out gauze cloth that is manufactured especially for surgical purposes. Johnson & Johnson combine the manufacture of surgical dressings with a cotton cloth mill.

in such mills. General conditions are unpleasant and no attention is paid to the health of the operatives.

The Red Cross Cotton Mills, however, stand in strong contrast. Few buildings erected for any purpose whatever are better lighted and ventilated. No other cotton cloth factory is comparable to this, say the visitors who are acquainted with the largest mills of England, New England and the South. The Red Cross factories are striking examples of American progress.

The Red Cross Cotton Mills alone




This view shows one corner of the J. & J. plant. This group is devoted solely to the production of Surgical Dressings made of cotton. The building in the foreground is over five hundred feet in length.

The advantage of manufacturing as well as preparing cloth for surgical dressings is not only an advantage but a necessity in order to obtain absolute cleanliness. Mills that turn out commercial cotton cloth manufacture from the commercial standpoint only, producing the greatest amount of goods at the least outlay of capital. Surgical cleanliness is not obtained or even understood

have been able to meet the present demands for better surgical goods, more reliable goods, more cleanly goods. And this concern alone has made the manufacture of surgical dressings a separate and distinct industry. Just as the invention of cloth-making machines began a new era in that industry, so the erection of the Red Cross Cotton Mills marked a new era in the production of gauze dressings for surgery.

# The Famous Roll

## The Famous Wrapping

## The Famous Cotton

Red Cross Cotton is made of carefully selected fibre in a surgical dressing laboratory.

The processes insure perfect absorbency and absolute sterility.

The result of a quarter of a century of study of cotton for surgical uses.

Peculiar to Red Cross Cotton is the form of wrapping shown here.

This wrapping forms a complete encasing of the cotton in tissue paper in such a way that it is entirely protected from exposure to infection whether in or out of carton.

The cotton cannot become infected without breaking open the carton and then the paper.

The cotton can be removed from its carton and portions cut from it without infecting the remainder.

Red Cross Cotton is to-day the standard for the world's production—a standard which is imitated and striven after, but which stands in a class by itself.

Red Cross Cotton is the world's standard.

In ordering specify Red Cross Cotton.

# First Aid Service

Johnson and Johnson have established a Service Bureau which has attained a foremost position in the now world-wide First Aid movement.

The Service reaches far beyond the production of outfits and supplies. It has assisted in the organization and installation of First Aid systems in some of the largest railway and transportation lines, mining companies and factory organizations in the world.

The Service is closely allied to, and utilized by, physicians, First Aid organizations, teachers, training classes, boards of education, railways, municipal departments and others interested in First Aid, in respect to text book requirements, literature, etc.

The Bureau has been of special service to teachers, instructors and classes which have been formed in factories, mines, Y. M. C. A.s, Boy Scout and Girls' Camp Fire bodies, and other institutions and associations. In many of these latter Johnson's First Aid Manual has been adopted as a text book, and their Instruction Outfit is used for demonstration.

The Service is prepared to co-operate with physicians, lecturers, teachers, instructors and heads of organizations and with individuals who may be interested in the subject of First Aid. In addition to the equipments and supplies the Service is prepared to furnish the following:

Merton's Anatomical First Aid Charts —A series of charts designed by Holmes W. Merton. Each chart 26 x 38 inches, in colors.

No. 1. Normal Skeleton and ligaments; Skeleton shows 14 fractures and dislocations.

No. 2. Circulation; complete view of chief arteries and veins and muscular and skeletal relations.

No. 3. Muscular System; two figures, with Bandages, Tourniquets, Compresses and Splints.

Figures half size with over 50 illustrations. For individual and class use. Price for the set, $5.00.

Lecturers' Exhibit—A series of photographs mounted on cards, showing uses of Triangular Bandage, arrest of bleeding, resuscitation, etc. Includes a Triangular Bandage. This exhibit is loaned.

Lantern Slides—A set of lantern slides covering bleeding, shock, fractures, resuscitation, bandaging, etc. This set is used by lecturers. Sold or loaned.

Instruction Outfit, used by teachers, classes, etc., contains bandages, splints and tourniquets to be used in practice work. Price $3.00.

Numerous publications upon the subject of first aid have been issued by the Bureau; at the present time the following are available:

Johnson's First Aid Manual, sixth edition, nearly 150 pages, illustrated in colors. Adopted as a text-book by railway systems and first aid societies throughout the world.

Price, cloth bound, 50 cents per copy; paper bound, 25 cents per copy.

Hand Book of First Aid—Suggestions for first aid to the injured in accidents and emergencies, containing brief instructions of the first essentials in emergency work. Free.

First Aid Study Schedule.—A pamphlet outlining the study of first aid to the injured in a systematic series of lessons. Valuable for the individual as well as for classes. Free.

First Aid Questions—Set of questions for beginners in First Aid based upon Johnson's First Aid Manual.

First Aid in Accidents, Circular No. 110.—Descriptive of Johnson's First Aid Cabinet, Household Accident Case, etc. Free on request.

First Aid Packet, Circular No. 180.—Describing and illustrating many varieties of first aid packets. Free.

COMMUNICABLE DISEASES

The prevention of the spread of contagious or infectious disease is rightly made a part of First Aid work.

The Bureau has issued a series of bulletins upon the more common contagious and infectious diseases (a separate bulletin being issued for each disease). In each bulletin is given practical methods for disinfection, isolation, and care of the sick in contagious diseases described elsewhere in this issue. Sent free.

# First Aid Helps

Below find illustrations of items which the First Aid Service of Johnson & Johnson is prepared to supply.

**Manual and Literature upon First Aid.**

**Instruction Outfit for class and team practice. Includes a Manual.**

**Cabinet No. 1. Thousands are installed in factories, schools, mines, railways, etc. The most complete outfit made.**

## INDEX OF IMPORTANT ARTICLES

PAGE

Some Bits of History ..... 50

From Cotton Wool to Absorbent Cotton ..... 54

Rapid and Safe Method of Ligating Vessels and Other Bleeding Points ..... 55

The Surgeon's Hand—Poem ..... 57

Vaccination—By Samuel T. Knaggs, Australia ..... 58

The Doctor and Cleanliness ..... 60

The Open Book ..... 62

The Therapeutic Uses of Adhesive Plaster ..... 63

Blood Vessel Surgery ..... 66

The Mechanical Value of Medicated Plasters ..... 70

Healthy and Contented Operatives ..... 74

How Synol Kills Germs ..... 78

The Therapeutic Value of Belladonna Plasters ..... 79

Why a Belladonna Plaster is a True Therapeutic Agent ..... 82

The Mustard Pack in Bronchitis in Children ..... 84

Preparations of Abdominal Sections and Plastic Operations and their Routine After Care—By John Cooke Hirst, M.D. .... 85

Sizes of Surgeons' Silk and Catgut ..... 88

First Aid Service ..... 94

# The Doctor's Hands

A most interesting article published in a recent issue of The American Journal of Clinical Medicine pronounces the dictum that the doctor's hands should be "clean, dry, warm, smooth and soft." He argues this not only as a professional but as a business necessity.

The best way known to secure this condition is through the use of Synol Soap. A practitioner eminent and busy in genito-urinary practice and who is in constant contact with infection and filth, says he washes his hands as much as two hundred times a day with Synol

Soap. He also cleanses his apparatus, test tubes, glasses and the like with the same soap. He feels assured that the infection is destroyed and washed away. He has the satisfaction of knowing that he and his hands are clean, and above all that they are kept smooth and soft. In fact he is noted for the gentle, unerring touch of his soft finger tips, a point so desirable.

Synol Soap will keep the doctor's hands clean, will remove and destroy infection, and is a good thing to recommend to patients.

Send for a sample of Synol Soap.

JOHNSON & JOHNSON

New Brunswick, N. J., U. S. A.

# For the toilet of the doctor, nurse and patient

SYNOL SOAP
FOR THE TOILET AND BATH AN EXCELLENT SHAMPOO
For the complexion, hair and scalp. Softens and preserves the skin.
SURGEON AND NURSE
For sterilization of hands, cleansing and disinfecting the sick room.
Johnson & Johnson

A perfect toilet soap with disinfectant power.

Made to suit babies and tender skin.

Will give the doctor and patient a perfect shave.

# Aids to mouth hygiene

A perfect dentifrice.

Dentists advise the daily use of floss silk for cleansing cavities and between the tee

Series VII. Number Four

# RED CROSS NOTES

PUBLISHED BY Johnson & Johnson NEW BRUNSWICK, N. J., U.S.A.

"The modern surgeon is, or should be, the cleanest man that walks the earth."
SYNOL SOAP
FOR THE TOILET AND BATH AN EXCELLENT SHAMPOO
For the complexion, hair and scalp. Softens and preserves the skin.
SURGEON AND NURSE
For sterilization of hands, cleansing and disinfecting the sick room.
Johnson & Johnson

# The Don't Worry Kind

**Without complete confidence in his catgut the surgeon feels a certain worry that is ever present while he operates.**

**If his catgut is too brittle it often breaks at the knot.**

**If it is not strong he must use larger strands than he cares to.**

**Sealed glass tubes containing the ligature preserved in the sterilizing liquid**

RED CROSS
ASEPTIC CATGUT LIGATURES
No. 2, LENGTH, 28 INCHES
IN DOUBLE ENVELOPE, GERM PROOF.
SIZE No. 2
Johnson & Johnson
NEW BRUNSWICK, N. J., U. S. A.

**Each envelope contains 28 inches of catgut**

If not strong he does not trust it and may not put enough pressure at the knot, causing a poor tie—then the ligature slips. If the second knot does not lie flat on the first throw, it may become untied later. It is almost impossible to tie a good knot with brittle catgut, because the gut is not soft enough to allow flat knots. They either become untied or the surgeon breaks his catgut in trying to bring the second knot down tightly against the first.

Catgut may be sterile—but if there is trouble at the knot the surgeon never can have full confidence in it.

Johnson & Johnson begin sterilizing the raw lamb's gut before it is twisted into a suture. The twisted material is sterilized again in the tube and after the tube is sealed. It is soft and pliable and to an expert the very feel of it tells the surgeon that it will "run even" while tying a knot.

Our gut is sterile before twisting, after twisting and remains sterile in the tube.

Samples will be sent upon request.

JOHNSON & JOHNSON
New Brunswick, N. J., U. S. A.

# RED CROSS NOTES

COPYRIGHT 1915 BY JOHNSON & JOHNSON

SERIES VII NEW BRUNSWICK, N. J. NUMBER FOUR

RED CROSS NOTES

Published by JOHNSON & JOHNSON, New Brunswick, N. J., U. S. A.

Fred B. Kilmer, Editor

This publication is issued from the laboratories of the publishers with the intent to give, in brief, items of interest and reports of original research along the line of the particular branches of the art in which they labor.

Persons receiving *Red Cross Notes* will confer a favor by notifying the publishers of any inaccuracy in the address on the wrapper and of any change of their address.

## RED CROSS NOTES

As many to whom this issue will come may receive it for the first time, some explanation is in order. A leaflet under this title was first issued in 1897, and in this issue it was stated:

"The primary intent of this publication is to give information as to our products, new methods, new issues of pamphlets and publications, together with such other matter as may be deemed of interest to all concerned."

Since that date the issues of the Notes have been irregularly continued. The issues for some time past have been confined to subjects believed to be of interest to the medical and surgical profession. The text of the pages is intended to be useful to those who may take the time to peruse them.

While many of the articles which appear are related in some respects to the preparations manufactured by Johnson & Johnson, they are adaptable to similar articles which may be made by others.

Many of the contributions are the result of correspondence with, or direct contributions from, specialists and practitioners, giving the methods followed in their own practice.

The handy form of the Notes and the brevity of its articles renders it attractive to the reader.

The editor and publishers are always appreciative of suggestions received from the readers, and herewith express a sincere desire for their continuance.

## WOUNDS IN THE EUROPEAN WAR

Dr. G. H. Makins, consulting surgeon to the allied forces, calls attention to the limited number of bullet wounds by machine guns or rifles, and the very large number of wounds inflicted by shrapnel shells. Wounds produced by small-caliber bullets are usually found in an aseptic condition, and for the most part uncomplicated, while shrapnel shell wounds, without exception, become infected and suppurate. In wounds produced by shrapnel bullets some are merely a bruise, while others penetrate, and others, again, produce injuries of the most severe explosive type. The entry wounds are comparatively small, while at the exit, especially where bones are centered, the surface may be a large mass of extruding, lacerated muscles with numerous fragments of bone exposed upon the surface.

The report calls attention to the fact that a man struck by a machine gun may have a line of wounds passing from right to left across the body. In one case five separate wounds on the same level were distributed across the chest. In the bursting of a shrapnel shell a large number of bullets may strike the same individual. As many as thirty-four wounds were counted on the body of one man. Multiple wounds cause extreme shock.

Type of wound dressing supplied by Johnson & Johnson for use of the allied forces in the European War, 1914. Consists of layers of cotton encased in gauze, a gauze pad and roller bandages, one of the latter being attached to the dressing.

The majority of the wounds do well; suppuration and fever, however, and sloughing of the soft parts are the rule. A very serious complication of wounds is the development of acute tetanus. The initial source of this infection is traced to the soil.

Wounds of the face and chest, with extensive injuries to the palate and head, are quite common, while wounds of the sacral region and abdomen are not uncommon and are often distressing. Fractures are numerous and severe; these are accompanied by large wounds and concussion. Injuries to the joints are of a gross nature, and almost without exception are accompanied by fracture of the articular ends of the bones.

Incidentally the report states that death has exacted a heavy toll among the medical officers employed with the troops.

## JANUS ADHESIVE IN X-RAY WORK

My use of Janus Adhesive Plaster for x-ray work consists in fastening one surface to a sheet of metal, producing an adhesive plaster with a metal backing. This will adhere exactly where applied, protecting certain parts from exposure, while the neighboring uncovered part of the patient is receiving x-ray treatment.

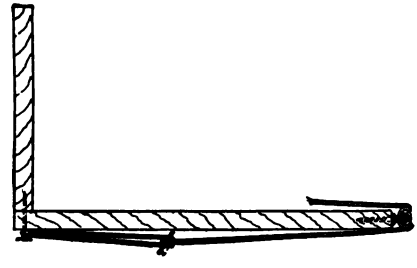
For radium therapy heavy sheet metal is rendered adhesive so as to act as a handle for a radium applicator, pressed against the adhesive surface, while the metal protects the patient's fingers from the radiation. Yours very truly,

SINCLAIR TOUSEY, M. D.

## IMPROVISED EXTENSION APPARATUS

Drs. J. H. Watson and T. Snowball have suggested an improvised apparatus in the treatment of fractures in modern warfare.

This apparatus as here illustrated is a rectangular splint made of two pieces of wood from half to three-quarters of an inch thick and about three inches broad, nailed together at a right angle. A screw pulley is firmly fixed into the center of the forearm piece and a strong nail is driven from below into the center of the right angle, leaving about a quarter of an inch projecting. Before applying the splint "Z O" Adhesive Plaster is affixed to the forearm. An extension string is led over the pulley to the underside of the splint, where it is fixed in a loop of rubber drainage tube. A simple string supports the forearm.



—Poor dressings—cheap absorbent cotton, unclean gauze, infected ligatures and bacteria-laden bandages used in wound dressing are worse than wet powder in the time of battle.

## THE STRIP AND CLIP METHOD OF CLOSING WOUNDS

Devised by
DR. ROBERT H. M. DAWBARN, NEW YORK

The closing of wounds represents a surgical problem all its own. Many surgeons have devised many methods in order to obtain a good cosmetic result, viz., as little scarring as possible. Another point, however, equally worthy of consideration is the avoidance of stitch abscess and pain occasioned by the removal of stitches.

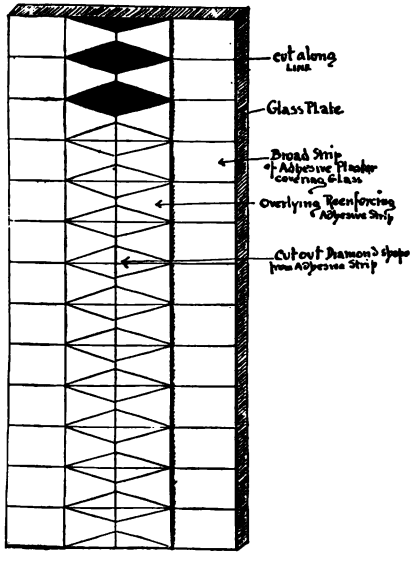



Fig. 1
"Z O" Plaster placed on glass plate for cutting

Dr. Robert H. M. Dawbarn has devised a method of closing wounds by means of Michel clips and Z O Adhesive Strips, alternately applied, which, as far as simplicity, rapidity and satisfactory results are concerned, leaves nothing to be desired. In his large surgical practice Dr. Dawbarn employs this method of wound closure for every conceivable operation, from laparotomy to cranial wounds, with perfect success and satisfactory cosmetic results, and the advantages derived warrant a full description of the technique.

For suturing the subcutaneous tissues, the skin edges are closely proximated with small forceps, and every inch along the line of incision a Michel clamp is attached. Between each clamp the skin is drawn together by Z O Adhesive Strips, which are sterilized over an alcohol flame, as shown in Fig. 3. This gives a minimum of adhesive surface directly over the wound, with a maximum of traction on the skin.

The sole reason for using the Michel clamps is to prevent the inverting of

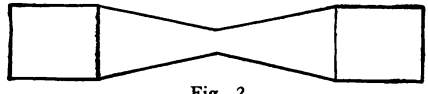


Fig. 2
Strip pattern laid out in lead pencil

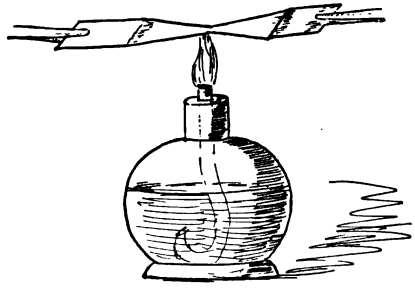


Fig. 3
Sterilization of the strip over an alcohol lamp

the skin edges, which does occur where adhesive strips alone are used.

The Michel clamps are removed after twenty-four hours, and the Z O Strips after ten days. Should they become soiled or loosened from discharges new strips may be applied.

Fig. 1 shows the method of making and cutting out Z O Adhesive Strips. A large strip of Z O Adhesive Plaster, from 3½ to 5 inches wide, is pasted on a glass plate. Over this, in the center, a smaller reenforcing strip, from 2½ to 1½ inches wide, is laid over for the purpose of giving additional strength.

The pattern is laid out in lead pencil, as shown in Fig. 2, and then cut out, as illustrated. This renders the strips ready for use when desired.

Before applying a strip of the plaster over the wound Dr. Dawbarn sterilizes the rubber surface over an alcohol flame, and this is where the re-enforcement

strips prevent suppuration, due to the heat or burning.

This method of wound closure preserves the integrity of the skin, prevents stitch abscess, does away with painful removal of stitches and leaves a very small scar.

Dr. Dawbarn is using this method ex-

Application of the finished strips

tensively in his work in the City Hospital, New York, in other institutions in which he is attending surgeon, and in his private surgical work, with great success.

## DIRTY HANDS AND TYPHOID

The experiments carried on by Major S. L. Cummins, and reported in the Journal of the Royal Army Medical Corps, demonstrate very clearly that unclean hands play an important roll in the spread of typhoid fever. His conclusions are based upon repeated bacteriological examinations of fingers of urinary and fecal carriers of typhoid bacteria.

These experiments further proved that the bacillus typhosis and other fecal organisms can be isolated from the fingers of carriers by proper cleanliness, and this fact is of great importance in connection with the contamination of foodstuffs as well as with the spread of the disease.

Since it is the unknown typhoid carrier who is innocently responsible for contamination, the necessity for absolute cleanliness everywhere is essential. In this connection the report of Mr. H. N. Jones, Bacteriologist of the Massachusetts State Board of Health, is of interest. He says:

"A considerable portion of public roller towels become contaminated with human feces. An unknown number of human carriers have typhoid bacilli in their feces. How many cases of typhoid fever are contracted through contact with soiled roller towels?"

Dr. M. A. Richardson, of the Massachusetts Board of Health, says:

"As far as unclean hands are concerned our course as regards typhoid infection would seem to resolve itself into the two following propositions: First, that inasmuch as no person can be absolutely certain that he is not a typhoid carrier (for, of course, it is well known that a healthy human being, and especially those attendant upon typhoid patients, may become a temporary typhoid carrier, even though he has not suffered from the disease itself) every one should, as far as possible, wash his hands with scrupulous care after any possible contamination with feces or urine, and, secondly, that no one should think of handling food, either for his own use or for others, without carefully washing his hands."

Carefully washing the hands implies the use of a soap which will effectually destroy typhoid bacteria. Synol Soap has a remarkable germicidal power. A five per cent. solution kills typhoid bacteria in fifty seconds; it softens and dissolves dirt, grease and scale in which bacteria are imbedded, exposing them to the action of the germicide. It is non-injurious to the cuticle, and its use will go a great ways toward minimizing the chances of carrying infection.

—The preparation of surgical absorbent cotton and surgical dressings made of cotton, from the fiber to the finished product, requires in every step of the process the same skill and accuracy that should be manifested in the preparation of every medicinal agent.

Pneumonia.—Dr. C. N. Owen, of Littleton, W. Va., writes that he has been using blisters in pneumonia in a practice of 48 years, and has never lost a patient under 60 years of age. He gives an instance of a blister being used in the treatment of pneumonia in a babe eight months old, with the happiest results.

## A TIME-HONORED PLASTER

Probably the oldest plaster on the American market is De La Cour's Adhesive Plaster. This plaster has had a continuous sale since 1825. Its manufacture during all of this time has been in the family of the originator.

Joseph Charles De La Cour was the original manufacturer of De La Cour's Adhesive Plaster. His father, Joseph Loriot Stanislaus De La Cour, was a Frenchman by birth, who came to this country during the war of 1812 and offered his services in the defense of the United States.

The younger De La Cour became one of the pioneer pharmacists of Camden, New Jersey, and engaged in the manufacture of the old-fashioned kid plasters, court plasters, and a general line of pharmaceutical preparations.

He worked out a new formula for an adhesive designed to produce a plaster that would not irritate the most tender skin, and also prevent the mass from drying out, cracking and peeling off the cloth. Having tried various backings upon which to spread the mass, such as linen, muslin, etc., it was found necessary to get up a special fabric so treated that the plaster mass would adhere to the surface and at the same time not be absorbed by the cloth when exposed to high temperature. The new product was put upon the market as De La Cour's Improved Adhesive Plaster and was extensively used in hospitals and in the army and navy of the United States.

Owing to its superior keeping qualities, and the fact that it was non-irritating, it at once became popular in tropical America, and today enjoys a large sale in the West Indies and South American countries, where it has never been replaced to any extent by the rubber base adhesive plaster.

During the Civil War large quantities of this plaster were supplied to the army and navy, and the laboratory was moved to larger quarters at Front and Arch streets, Camden, N. J.

The making of this plaster descended through the family of the originator to Joseph Carl De La Cour, a graduate of the Philadelphia College of Pharmacy, who became identified with the J. Ellwood Lee Company, and from this source the manufacture of this time-honored plaster has passed into the hands of Johnson & Johnson.

De La Cour's Adhesive Plaster is essentially a diachylon, or lead-base, plaster mass. As manufactured by Johnson & Johnson it is spread upon a highly calendered, specially prepared, fine muslin. In this particular it is superior to the foreign and other imitations, which are, for the most part, spread upon a gauze-like material that is filled with starch, and which is stiff and hard to adjust.

The distinction of De La Cour's Plaster from those made with a rubber base is that De La Cour's Plaster is warmed before applying, yet its composition is such that absolutely no irritation is produced, even when applied to the most delicate skin. This fact makes De La Cour's Plaster valuable, especially in cases of contusion, cuts and other places where there is likely to be suppuration or inflammation. The application of De La Cour's Plaster is invariably followed by a soft and healing effect. There is a large use for De La Cour's Plaster in cases where the dressing must be retained in position for a long time, for orthopedic work and for use among children.

De La Cour's Adhesive Plaster may be obtained in the following styles:

On strong cotton cloth—5-yard rolls, 14 inches wide; 1-yard rolls, 7 inches wide.

On moleskin—5-yard rolls, 12 inches wide; 1-yard rolls, 6 inches wide.

---

—Camphenol is an excellent antiseptic mouth wash; two or three drops in a tumbler of water is sufficient

## THE GERMICIDAL POWER OF CAMPHENOL AND SYNOL SOAP

**An account of experiences with the Hygienic Laboratory Method of finding the phenol coefficient of germicides.**

**Contribution from the Scientific Department of Johnson & Johnson.**

There has developed during recent years, on the part of bacteriologists and of others, a desire to standardize all products offered for sale. From this has arisen an attempt to devise a method of comparing the disinfecting or germ-killing power of disinfectants with some standard, and of expressing the results in definite figures.

The "Rideal-Walker" method and later the "Lancet" method were developed in England, and have been extensively discussed and tried.

### The Hygienic Laboratory Method

In 1912 there was published by the Public Health and Marine Hospital Service of the United States a pamphlet known as Hygienic Laboratory Bulletin No. 82. This contained a "Method of Standardizing Disinfectants" by John F. Anderson and Thomas B. McClintic. The method is known as the "Hygienic Laboratory Method." It is now generally recognized as the official procedure for determining the value of disinfectants.

The method is an attempt to express a comparison between the germ-killing power of any given disinfectant and pure carbolic acid (phenol), the germ-killing power of carbolic acid being taken as a standard. The germ-killing power upon the organism selected—typhoid bacillus—and under conditions named, being called unity (1.00), the germ-killing power of the disinfectant being tested upon the same organism and under the same conditions, is expressed as the phenol coefficient. In other words, its germ-killing power is expressed in terms of phenol or carbolic acid.

The Hygienic Laboratory Method may be stated briefly as follows:

A culture of the bacillus typhosis (typhoid bacillus) is made in a nutrient broth. A definite quantity of this virulent culture is mixed with a solution of phenol of definite strength, also another definite quantity with a solution of known strength of the disinfectant to [illegible]d is mixed with another portion of the virulent culture. These mixtures of disinfectant and culture are allowed to stand for definite periods of time (2½ to 15 minutes) at a definite temperature.

At the end of the time a loopful of the culture which has been acted upon by the disinfectant is transferred to fresh nutrient broth and subjected to incubation to ascertain whether the bacillus has been destroyed, or will grow.

The strength of the solution of carbolic acid required to kill the bacillus in a given time is taken as 1, and compared with the action of the disinfectant under test in the same strength solution for the same time.

The testing laboratory of Johnson & Johnson has tried out the method thoroughly, and applied it to examination of preparations made by them which lay claim to germicidal properties.

This being a new and not yet well-tried method, they have caused their tests to be duplicated by an outside independent laboratory, so that notes and results could be compared in order to arrive at a thoroughly satisfactory and safe conclusion. This work was done by the Lederle Laboratories, of New York City, as will be referred to later.

Our formula for the nutrient broth, or culture medium, was:

| | |
|---|---|
| Liebig's Beef Extract.. | 3 grams |
| Peptone (Witte) ..... | 10 grams |
| Water .....1000 | grams |
| Salt ..... | 5 grams |
| Reaction .....plus | 1.5% |

*Manipulation.*—To a novice in the manipulation of this method it seems to be very difficult to keep a correct record of the position and contents of each of the many tubes, for the work must be done rapidly and practically automatically.

We therefore constructed a time-table for working by the clock from any even hour, so that the attention need not be taken from the actual manipulation.

In the official method tests are made for 2½, 5, 7½, 10, 12½ and 15 minutes. Only the 2½ and 15 minute figures are used in calculation of results.

Merck's (silver label) phenol is prescribed in the official method. This was used in some of our tests, and in other series Powers-Weightman-Rosengarten Company's make was employed.

*The Organism.*—In our work we used a culture of B. Typhosis secured originally from H. K. Mulford Company. We used this in all work, each series of tests being made with a culture that had been transferred to fresh tubes of broth on each of three consecutive days and incubated at 37 degrees C. for the 24-hour periods between the transfers.

The Lederle Laboratories used the so-called Hopkins strain of B. Typhosis.

*Source of Samples.*—The samples of Camphenol and Synol Soap used by Lederle Laboratories were purchased in the open market from sources unknown to Johnson & Johnson. The samples used in the Johnson & Johnson tests were taken from the shelves of the shipping room at the works.

*Conclusions.*—The results given here were all checked by duplicate series, both by the Johnson & Johnson and the Lederle Laboratories.

On the whole, these results are probably as nearly concordant as any two operators could secure in tests of this kind.

We see no reason why the Hygienic Laboratory Methods should not continue to be satisfactory and of sufficient accuracy to remain as a standard American method for determining the phenol coefficient of disinfectants.

### Phenol Coefficients

| | |
|---|---|
| Camphenol (Lederle) | 3.46 |
| Camphenol (J. & J.) | 3.20 |
| Synol Soap (Lederle) | .41 |
| Synol Soap (J. & J.) | .47 |

### Summary

A dilution of Phenol 1 to 80 kills the typhoid organism in two and one-half minutes.

A dilution of Phenol 1 to 100 kills the typhoid organism in fifteen minutes.

A dilution of Camphenol 1 to 275 kills the typhoid organism in two and one-half minutes.

A dilution of Camphenol 1 to 350 kills the typhoid organism in fifteen minutes.

A dilution of Synol Soap 1-30 kills the typhoid organism in two and one-half minutes.

A dilution of Synol Soap 1-45 kills the typhoid organism in fifteen minutes.

## UMBILICAL HERNIA IN INFANTS

(Contributed)

Umbilical hernia in very young children is not rare. A typical tumor, which becomes tense and large at every cry, suggests the diagnosis and precludes the likelihood of cure without attention. The fact, however, that this condition is easily amenable to treatment, with very little trouble and chance of failure, makes the prognosis a good one.

The following is a plan of treatment which will be found very effective:

Clean the whole abdominal wall with Synol Soap and water. This is antiseptic, cleansing and non-irritating. Dust the skin around the navel with equal parts of Johnson's Toilet and Baby Powder and stearate of zinc. Take a small quantity of clean absorbent cotton, put some of the powder over the cotton, roll it into a tight wad and place it immediately over the tumor and reduce it. Then grasp a fold of skin on either side of the tumor and attach thereto strips of Z O Adhesive Plaster, which must be firmly anchored from side to side. The whole area is finally covered with several layers of Z O Adhesive Strips, assuring the utmost rigidity.

The strips remain intact for from two to three weeks; if they become loosened they must be reapplied. It is essential to keep the child quiet during this operation to prevent forcing out of tumor. The second strapping is again to be left on about two or three weeks. Subsequently a tight band may be worn for six weeks to give additional support.

## A BULLET IN THE HEART FOR THIRTY-SEVEN YEARS

A man recently died of cancer in Ohio, who claimed that he had a bullet in his heart which he had carried since he was shot by a bushwhacker in the civil war, and he requested that after his death an autopsy be made. The autopsy was made by Dr. O. B. Beer, who reports, in the Cincinnati *Lancet-Clinic,* that he found the bullet in the heart as claimed. It had entered the left chest and, passing through the left lung, entered the left ventricle, where it was found thirty-seven years afterwards.

## CARE OF THE SURGEON'S HANDS

(Contributed)

For obvious reasons the surgeon's hands should be smooth and soft and the skin unbroken. Roughening and cracking of the skin may result from:

First, uncleanliness. Contact with dirt and grit that becomes rubbed into the surface by constant friction;

Second, improper and inefficient washing. The use of hard water, the use of

impure, irritating soaps and soaps containing alcohol or formalin, and not rinsing the soap off thoroughly after washing;

Third, the use of chemical antiseptics through the impression that they secure asepsis;

Fourth, exposure to cold or contact with coarse woolen clothing worn during cold weather, and wearing woolen or other gloves that irritate the skin or deprive it of its moisture and natural oil.

If a pure soap is employed it is possible to wash the hands thoroughly from fifteen to twenty times a day without irritation to the skin surface. Kid or leather gloves, unlined or silk lined, should be worn, or a lisle glove in summer.

The hands should be washed often during the day, and at least once or twice with the nail brush, particularly on retiring. The nails should be kept closely trimmed, leaving no space under them for dirt to collect. Hang-nails and callous about the fingers should be trimmed off, and rough places about the fingers and nails should be smoothed down with fine sandpaper.

In recommending Synol Antiseptic Liquid Soap for constant every-day use for the surgeon and physician, we have been influenced by an extensive experience with its use, and a knowledge of its peculiar fitness to accomplish what is desired, based upon most thorough and painstaking experimentation. It is prepared with a perfectly pure soap base, so combined with the antiseptic that the one aids the other. Hence, in using it, asepsis of the surface washed with it is accomplished by both a mechanical and chemical process. This cleanliness is obtained without injuring the skin; on the

contrary, the surface is rendered smooth and soft, and it remains so when this soap is employed exclusively.

Therefore, Synol Soap should be used constantly for washing the hands, even for ordinary washing, because it cleans the surface better and more surely than any other soap, keeps the skin smooth and preserves its integrity.

The hands should be washed in water neither too cold nor too hot. Running water of a satisfactory temperature is best. They should first be wet with the water, then a teaspoonful of the liquid Synol is poured into the palm of one hand and with the other it is thoroughly rubbed into the surface, briskly, until it lathers well. This is rinsed off and the process is repeated with a second supply of soap. Then the soap is to be rinsed off completely.

The nail brush need not be used except when extra cleanliness or absolute asepsis is required, or when the hands have been contaminated by contact with pus or other infecting discharges. The nail brush could well be used, however, once or twice a day under ordinary conditions, and before going to bed at night.

In cold weather some skins will chap

or become rough if washed often, even if the best soap is used; hence, when frequent washing is required, and particularly when a nail brush is used, some other precautions are necessary to obviate this. It is recommended that a half or a teaspoonful of the following mix-

ture be applied to the hands and rubbed in well after they have been washed and dried. This is not to be wiped off, but allowed to dry on the hands:

Rosae .....Five drops
Cajuputi .....Fifteen drops
Glycerine .....One ounce
Spts. Myrciae.....Three ounces

When bad chapping or cracking has occurred wash the hands thoroughly and apply at night a pure cold cream which is made up with glycerine and lanolin. Repeat this in the morning and wear cotton gloves constantly during the day, until the surface becomes smooth.

Synol Liquid Soap is recommended for every-day ordinary use, as well as for preparing for operative work, because it is clean, and because it cleans the hands effectually and keeps their surface smooth and soft.

## SIMPLICITY IN TECHNIQUE

There are almost as many different methods as there are men. This is just as true in medicine and surgery as in other professions. The reason therefor is perhaps a constant desire for improvement and individuality; but instead of attaining simplicity they help to complicate methods.

In my routine work, which comprises a fairly large surgical and medical practice, I have tried to do things in the simplest possible way. This saves time, trouble and frayed nerves. One very often finds in text-books the most cumbersome instructions regarding asepsis; it is well-nigh impossible to carry out the strictures imposed upon the reader. I have tried, therefore, to arrange for myself a method at once simple and useful by which I can arrive at the desired end. Preparations for any procedure strain the nerves of patients, and the less time consumed the better for all.

Most instruments, for instance, can be boiled if there is time, but if in continuous use, as in clinic work, where a large number of cases are already infected, boiling may take too long, and I have found that washing the instruments in a Synol Soap solution, then passing them through a solution of carbolic acid and rinsing in alcohol, is a quick procedure, and effectively renders them sterile enough for all purposes.

The hands are easily sterilized by scrubbing with Synol Soap, and this also answers for the nurse, attendants, or for any area that needs cleansing or shaving. The operating field is then painted with tincture of iodine. Tincture of iodine is sufficiently antiseptic to render needless any other antiseptic solution, such as bichloride or carbolic acid. Iodine stains can be subsequently removed with a solution of sodium hyposulphite.

The closing of skin wounds with adhesive plaster, instead of ligatures, has saved me a great deal of time, and the patients a lot of trouble and pain. Where ligatures are needed I generally use the Johnson & Johnson envelope, all sterile and ready for instant use. Catgut in glass tubes is used occasionally. As a rule I don't boil them; they are either washed with Synol Soap or immersed in a twenty-five per cent. solution of tincture of iodine. That answers for every purpose. It dissolves the grease which may be on the glass and *saves much time.* That's the object.

All my dressings are bought in ready packages, and when needed for operations are simply baked in the oven with the towels, etc.

This is a practical age, and each of us devises a means which leads to success. Some take up a lot of time doing it. My idea is to do it well—and quick.

This may interest some of your readers. Fraternally yours,

Dr. J. C. McGuire.

## THE DOCTOR'S PART IN FIRST AID

Curiously enough doctors do not always agree in their attitude toward the recent developments in respect to first aid to the injured. There are members of the profession who eschew it entirely, assuming that it has a tendency to become meddlesome and injurious rather than helpful; others foreseeing or hoping that movements of this character tend in their finality to the benefit of all, give to it their cordial endorsement and in many instances enter heartily into the work. Divergence of opinion is in some respects brought about by misapprehension of the legitimate field for first aid.

**First Aid is a bridge over which the injured person is carried to permanent medical treatment**

We are apt to associate first aid with philanthropic movements and the advance of modern times. Records, however, show that the ancient Egyptian, Greek and Roman military expeditions had means by which they transferred a supply of medicaments and appliances for emergency use. Exploring expeditions and missionaries have always given attention to supplies of this character.

First aid is apt to be associated with the work of the Red Cross societies and movements of a similar character. This is incorrect. These associations had their origin in an attempt to mitigate the horrors of war by becoming an arm of the military service and applying the principles of humanity and neutrality through an organization or a trained staff. The aim of the modern first aid movement is quite different.

First-aid-to-the-injured has aptly been described as a bridge between an accident and medical or surgical assistance, and over this bridge the injured person is to be carried from the place of injury to a place of treatment. Once the bridge is crossed and the injured person is placed in the hands of a medical attendant (or hospital), first aid is at an end.

Such action as may be taken to relieve the injured person from immediate suffering and prevent further injury, or action intended to remove the patient to a place to receive needed medical or surgical attention, is first aid. Such action is first aid, whoever may render it. A person trained in first aid, a physician, or a nurse, may render more skillful aid than one who is untrained, but in every instance the action is first aid.

First aid teachers, workers and trainers are quite apt to go beyond the scope and limitation of the true idea of the foundation of first aid as here outlined. For example, the treatment and care of injuries, the administration of medicines, the diagnosis and treatment of disease are no part of first aid work. It is undoubtedly a mistake for first aid teachers to attempt to train workers in anatomy or physiology, except when limited to the most elementary phases; certainly it is far outside the principles of first aid to attempt the treatment of disease, the after-care of wounds, the setting of fractures and the like. It would seem to be dangerous for first aid workers to attempt the administration of hypodermic injections, or any form of treatment other than the simplest temporary measures.

It is quite apparent that first aid does not aim to train workers to become surgeons or doctors; it simply desires to explain to the general public how its members can be of service in an emergency and while waiting for the doctor.

It is also of very great importance to the medical man, when he arrives at the scene of an accident, to find on the spot someone capable of giving him material assistance, and with sufficient training and intelligence to receive and execute his orders with promptness and dispatch. Such a one is generally found in the person of the modern first aid student, for, however slight may be his knowledge, he makes a far more efficient assistant to the doctor than an individual without any such elemental training, who often loses his head on the occurrence of the slightest accident, gets panic-stricken or faints at the sight of blood, becoming himself a subject for first aid.

Many a valuable life might have been saved did the doctor have someone at hand with even a rudimentary knowledge of the principles of first aid, to whom he could delegate some of the work devolving upon him at a critical moment; in a word, to multiply himself. Every surgeon who has assisted at the scene of an accident will recall such an occasion.

The work of first aid is of a palliative nature; it is to lessen suffering and to prevent pain. The point is aptly expressed in the introductory pages of Johnson's First Aid Manual:

> "The layman into whose hands this Manual may fall should bear in mind the oft repeated injunction 'to send for a physician.' However great or small may be the emergency nothing can take the place of the physician."
>
> "A little learning is a dangerous thing."
>
> "Beware of the axe in the hands of a child."
>
> "All of the First Aid Manuals ever printed, if taken together, would not transform a layman into a surgeon. Hence it is of great moment that the layman shall acquire the art of knowing just when to cease all attempts at First Aid, and place the patient in the hands of a surgeon."

The development of modern first aid in its legitimate field is entitled to the hearty co-operation of all members of the medical and surgical profession, many of whom have already become hearty workers and supporters in associations, schools, and industrial systems, devoting much time to giving elemental instruction on the best course to pursue in case of accident. First aid principles are being embodied in the institution of measures tending to prevent the spread of contagious disease.

J. Q. A. Ward's original "Good Samaritan." Presented to the Polyclinic Hospital, No. 341 West 50th Street, New York City, by the sculptor's wife.

Physicians generally are quite ready to recognize—with a self-sacrificing spirit which is unknown outside of the medical and surgical profession—the advisability of promoting every movement that bids fair to be for the good of humanity.

Upon the medical and surgical profession devolves the task of doing their part—the placing of the practical application of first aid in its right relation, and holding it to its own legitimate place. When properly carried out, first aid becomes a substantial aid and a benefit to mankind.

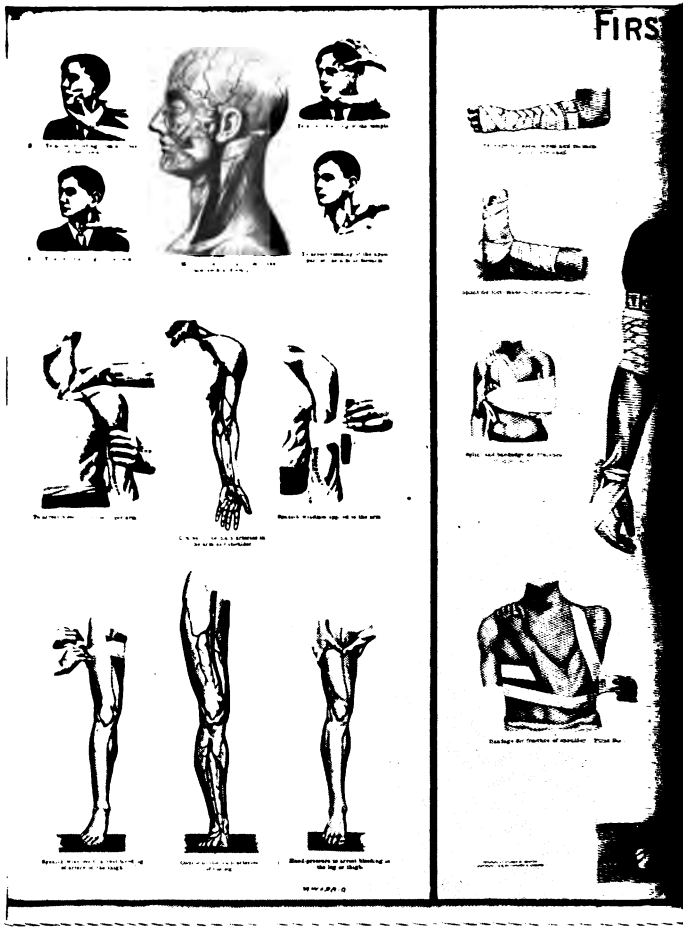
# A New E

## Johnson's

A complete guide to First Aid.

All the anatomy and physiology that is wanted.

Full of practical First Aid.




Johnson's First Aid Chart, size 27 x 44 inches, mounted on heavy board, instructions in black and white.

This chart opens a new chapter in the spread of rational first aid. It is a teaching chart and a complete practical guide to first aid work. It is a working chart—an art creation—anatomically and scientifically correct. It covers the whole range of first aid in picture and text, including bleeding, fractures, bandaging, fainting, drowning, machinery and electrical accidents, burns and scalds, with a table of antidotes, etc.

# n First Aid

## Aid Chart

carrying. The front is in ten colors; the back contains full first aid
n and art work cost over $3,000

**Useful for the doctor in teaching and explaining First Aid.**

**Suitable for schools, organizations, factories and shops.**

This most complete, practical and convenient First Aid Chart will appeal to the doctor and the nurse as well as to the instructor in first aid and the lay student. It embraces instructions and systems that can safely be placed in the hands of classes, schools, teams, factories, shops, or in the home. It teaches what to do before the doctor comes and—when to stop.

This chart is sold by leading druggists and supply houses, or will be sent postpaid upon receipt of price.

Price, $3.00, carriage paid.

# Red Cross Notes

## A FIRST AID GUIDE

**Doctors are now being asked about first aid. These inquiries come from organizations, factories, schools and indeed from everybody, for first aid information is now everywhere in demand.**

Here is a book that will help you answer all those questions about outfits, literature, supplies and the like, which apply to first aid. Johnson's First Aid Catalog describes and illustrates the First Aid Outfits which they supply to factories, mines, railways, schools, institutions, etc., and gives the uses of the various materials in the outfits, together with a list of all available supplies and literature for instructors and students.

This catalog will be sent free to any doctor or first aid instructor who will write for it.

When writing specify First Aid Catalog No. 110.

Address: First Aid Department, Johnson & Johnson, New Brunswick, N. J.

## DON'T WASH THE HANDS UNLESS YOU CAN DO IT WELL

Von Eiselsberg, of Vienna, is inclined to discard the use of all the accepted antiseptic solutions in the first treatment of urgent surgical dressing.

He says that if the surgeon is not situated so that he can wash his hands thoroughly, he had better not wash them at all, for the moisture and scrubbing will only get the bacteria loose, so that they will the more easily get into the wound.

In all of which we believe von Eiselsberg displays a great deal of good common sense, not to say scientific acumen, in so far as his position relates to the use of the commonly employed solutions and the ordinary cleansing soaps.

But what if one can find a genuinely antiseptic soap, which emulsifies, and mixes with the organic matter of the skin, the sweat, etc., thus allowing perfect germicidal action to take place? This would be the ideal procedure, meeting all the objections that von Eiselsberg properly raises to the ordinary methods of hand-sterilization.

And such a soap is available in Johnson & Johnson's Synol. It offers a powerful combination of cleansing and germicidal value.

The typhoid bacillus is killed in two minutes by a three per cent. solution.

For office work, where antiseptic solutions are difficult to attain properly, Synol adequately fills a genuine want.—*American Journal of Clinical Medicine.*

## PREPARATION FOR OPERATION

(Contributed)

### The Hands

Of primary importance to the operator is the sterility of his hands. They must at once be surgically clean, as well as smooth. Harsh antiseptics, such as bichloride or carbolic acid, may accomplish the one, but are certain to fail in the other. Many surgeons in past years have used Synol Soap, a nail brush and running water as their only sterilizing agent.

The following technique produces a sterile surface, as has been proven by many laboratory tests, and besides it leaves the skin smooth and soft:

The hands are first immersed in water as warm as can be comfortably borne to wet them thoroughly, rubbing them together to accomplish this more thoroughly. Then a quantity of the Synol is poured into the palm of one hand, and it is rubbed well into the whole surface by briskly rubbing one hand with the other. Then it is rinsed off under a stream of water from the basin faucet, or by dipping them into a basin of warm water. A quantity of the Synol is then poured on a stiff nail brush, previously sterilized, and every part of the hands, the fingers, about the nails, and under the nails particularly, is scrubbed vigorously for two minutes (actual time).

The lather is now rinsed off, and the nails, which should be kept short, are carefully cleaned with a dull nail blade or a flat pointed stick. Then taking a fresh supply of the Synol on the nail brush, the hands, fingers and nails are again scrubbed vigorously for three minutes more, after which the soap is rinsed off with sterile water as warm as can be comfortably borne. If this is done thoroughly the hands will be sterile.

When the forearms are to be sterilized with the hands, another five minutes must be consumed for this. The surface of the forearm, including the elbow and a little way above it, is first thoroughly wet with warm water. Then the pure Synol is rubbed into the whole surface with the hand, then with a coarse cloth, upon which some of the Synol is poured. This should consume two or three minutes, then the soap is rinsed off under a stream of hot water. After this the surface should be scrubbed with nail brush and Synol for two minutes, and the soap rinsed off several times with hot sterile water.

Only a sterile towel should be used for drying the hands.

When running water is not used for rinsing, and this is done by dipping the hands into a basin of water, the basin should be emptied and refilled with fresh water after the preliminary washing, and again after the first scrubbing. Running water is much better for rinsing. Where this is not available the rinsing may be done by pouring the water over the hands from a pitcher.

Soap, to render the skin thoroughly clean, must be decidedly alkaline. The presence of the alkali is necessary to soften the horny skin scurf, to emulsify the layers of fat and to neutralize the fat acids deeply embedded and dried hard in the depressions of the epidermis.

But herein lies the difficulty. The highly alkaline soaps obtainable—soft soap, green soap or even the laundry soaps—are caustic in action, and the surgeon can see in the scrub-woman's hands the energetic action resulting from their continuous use. The ordinary alkaline soaps are very pulpy and sticky, and this stickiness increases with the alkaline content. It is evident that soap of this character would embarrass the operator by making the skin rough, and by binding the infective material under a slimy coat.

The requirement is for a soap that is in itself soluble, smooth, and sufficiently alkaline to soften, dissolve and emulsify the secretions of the epidermis, whatever may be their nature, and by thus rendering them soluble make them removable by water. All this must be accomplished without injuring the texture of the skin.

And Synol Soap does this.

### The Field of Operation

The necessity for a sterile operating field has caused many complicated procedures. Simplicity and certainty being the keynote of modern surgery, we suggest an effective method of sterilization which renders the operating field as surgically clean as any skin surface can be made.

The surface should first be lathered with the Synol, then shaved closely, re-

moving all hairs. A piece of gauze, folded into four or eight thicknesses, large enough to cover the surface for three or four inches on all sides of the proposed incision, is spread thickly with Synol undiluted, so as to saturate it. This is done by placing the folded gauze on a flat, clean surface, and pouring the Synol over it, spreading it over the surface with a clean knife or spoon. This pad of gauze, saturated with Synol, is laid over the surface of the skin, covering the site of the proposed incision, and over this is placed a layer of sterile cotton, which is held in place by strips of Z O Adhesive Plaster and a bandage.

This is permitted to remain for from four to six hours, when it is removed and the surface scrubbed with nail brush and Synol, then rinsed off with warm sterile water and dried with sterile gauze, and afterwards covered with a pad of dry sterile gauze, which is not removed until the patient is placed on the operating table.

This process is described for the benefit of those who believe a soap poultice necessary before incising the skin. Thorough scrubbing with Synol is sufficient to sterilize the skin.

The method advised, which is absolutely reliable, is to scrub the surface thoroughly with a gauze pad or nail brush saturated with Synol, and wash off with sterile water as hot as can be comfortably borne. Then the surface should be shaved and again scrubbed. This is done twelve hours before the operation, and a pad of sterile gauze is placed over the surface scrubbed and held in place by a bandage.

On thin-skinned, sensitive women the nail brush cannot be used.

When the abdomen is to be prepared for incision the whole surface from the ensilform cartilage to the pubes, and out to the limit on both sides, is to be scrubbed and shaved. The depression of the umbilicus must be given careful attention, and in addition to scrubbing with nail brush, the Synol must be poured into it and then it should be scrubbed thoroughly with a pledget of gauze grasped in forceps, or wrapped around a blunt stick or applicator.

The scrubbing should always be repeated on the table, and after the soap has been rinsed off with plain, hot, sterile water, the part may be rinsed again with warm, sterile, normal salt solution, and dried. Then the surface is swabbed with alcohol, allowed to dry thoroughly, and the whole area is painted with tincture of iodine.

This is a modern and efficient way, and is practised in most hospitals.

### Sterilizing the Room for Operation in Private Homes

It is the lot of only a small number of surgeons to have hospital facilities for their operations. The great majority of able men throughout this country have to do their work in private homes of varying degrees of cleanliness, and in order to do justice to their skill and to their patients they have to exercise great care in the preparation of the room wherein the operations are performed.

Cleanliness is a great adjunct to the success of an operation, and in carrying out the methods of modern asepsis the few principles recommended here will prove quite useful.

Wherever possible the operation should take place in a separate room from that containing the patient's bed, but on the same floor with, and convenient to it. The curtains and draperies, as well as all superfluous furniture, chairs and sofas, should be removed; only wooden or cane-seated chairs should be retained. After the floor has been gone over thoroughly with a stiff broom or brush, to remove superficial or loose dirt and that in the cracks, it should be scrubbed thoroughly with Synol Soap, wetting the floor first, then sprinkling it plentifully and scrubbing with a good stiff brush. The soap afterwards is rinsed off with a solution of Synol, two tablespoonfuls to a pail of hot water.

The woodwork, particularly over the doors and window frames, should be washed with the same solution, and, where feasible, the walls should also be washed with it. If they are kalsomined walls they, and the ceiling, should be given a fresh coat. If the walls are papered they must be wiped carefully with a damp cloth, rinsing it in a five per cent. solution of Synol. Every piece of furniture that remains in the room should be washed well, all over, with a solution of Synol, two tablespoonfuls to a pail of water.

Everything to be used about the operation—towels, sheets, etc.,—should be

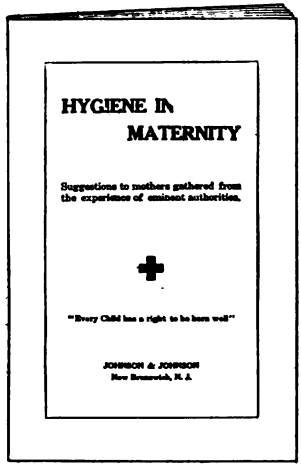
first washed thoroughly, then boiled for ten minutes in a two per cent. solution of Synol. Then they are wrung out with hands that have been carefully sterilized for ten minutes with Synol and nail brush. If the wringer is used it should be washed carefully beforehand with Synol. These articles are then hung out to dry in a room free from dust, where they can be exposed to the sunlight. If the operating room has been prepared beforehand they may be dried there, and it should be closed until everything is ready for the operation.

These directions should be carefully carried out wherever an operation of any importance is to be done in a private house, and the preparation described may be satisfactorily accomplished under the direction of the physician, without the aid of a trained nurse, if necessary. For minor operations this extensive preparation is not absolutely imperative, but it is always better if there is sufficient time for it.

## HAND THIS BOOK TO EXPECTANT MOTHERS

It is impossible for the busy practitioner to be always at hand to answer questions and give advice during the period of pregnancy. Some physicians write out instructions and give them to their patients, but this is laborious.

To satisfy a demand of long standing a booklet, "Hygiene in Maternity," has been issued by the Scientific Department of Johnson & Johnson. This booklet has been compiled by competent authorities on obstetrics, and contains all the information which the


HYGIENE IN
MATERNITY
Suggestions to mothers gathered from the experience of eminent authorities.
"Every Child has a right to be born well"
JOHNSON & JOHNSON

physician would wish his patient to have, but which he may not have time to give personally.

Many doctors have given a copy of this book to all expectant mothers on their list. It contains directions for the diet and general care of the patient from the beginning to the end. It is a manual of simple advice to which the physician may add such special instructions as he may desire.

Copies of this book will be sent free on request.

## KNOTS

In the practice of surgery the tying of knots is a highly important affair, much more so indeed than the layman could imagine possible.

The tying or ligating of arteries which have been cut, and the sewing or suturing of muscles and other tissues, all depend finally upon the tying of the ends of the thread in a knot. Where silk or linen is used there is not much trouble experienced from this cause, nor is it a matter requiring a high degree of skill to tie a firm and safe knot in these materials.

However, since the advent of catgut and absorbable suture material into surgery, surgeons are confronted with a new problem and an entirely different one. Those who have not tried it a little probably have no conception of how difficult it is to tie a secure knot with wet catgut. It is slippery and soft, and because it is a twisted strand it squirms to such an extent that a knot which would be perfectly firm in any other material will slip out readily when tied in catgut. The knot being such a very important matter, and one upon which depends many a human life, surgeons have given it most careful attention. In the first place, it is necessary that all knots tied in catgut shall be flat knots, sometimes also called reef knots, and never in any case should granny knots be tied, because they will certainly slip.

Now, in order that knots shall be most trustworthy, surgeons have developed the practice of making two throws instead of one throw, as in the usual knot. Generally this double throw is made only on one of the turns, as shown in the illustration. Such a knot is much more secure than a knot made with two single throws, but right here is where the quality of the catgut suture material is shown up. Frequently a surgeon's patience has been tried by the sudden snapping off of the catgut close to the knot, just as he had considered the matter finished. Quite properly, surgeons judge the quality of catgut from its behavior at the knot, but on the other hand operators cannot afford to be too critical and must not expect too much of catgut. It will not stand sudden, hard jerks, and any catgut can be broken if the surgeon saws up and down on it.

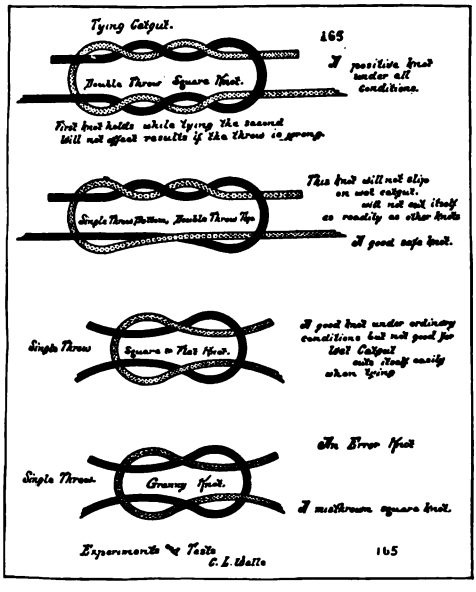
There is a limit to the amount of tension which catgut can withstand. Johnson & Johnson catgut is the result of years of effort and research to produce a suture material which is superior to any in the world, because it is made of clean, pure intestinal material taken from lambs and cleaned thoroughly by Johnson & Johnson themselves, so that we know exactly what it is made of. The Johnson & Johnson catgut is distinctly more flexible than any other on the market. Surgeons will find that in using it they can tie the second throw down closely on the first without having the gut snap off.

The second illustration given herein shows the right and the wrong way. Fig. 1 illustrates a flat knot which has not been properly drawn down, so that an open loop can be seen between the two throws. This is a very dangerous condition in which to leave a catgut suture, as it will almost certainly slip later on. With some makes of catgut ligatures it is almost impossible to do otherwise, because the catgut will break off if it is pulled down firmly and tightly where it belongs, as shown in Fig. 2. Those surgeons who have been using such catgut will be surprised when they try the Johnson & Johnson product and find how tightly it can be tied without danger of cracking off. Fig. 3 shows the double-throw knot followed by a single throw, not drawn down, and Fig. 4 shows the same drawn down correctly.

Surgeons are further hedged about with difficulties in regard to tying, in that they must not draw the tissues together too tightly, otherwise the action is to strangulate and interfere greatly with circulation, in some cases to such an extent that disastrous results are produced.

Some surgeons who have not thoroughly familiarized themselves with the latest developments in the preparation of absorbable ligatures persist in using plain catgut only, not realizing at all the tremendous advantages of catgut hardened by the chromic processes. As a result these surgeons, in order to be satisfied that their sutures of plain catgut will remain sufficiently long before absorption, are obliged to use very large

sizes of catgut, with the necessary consequence that the knots are extremely large and difficult to tie, also slowly and difficultly absorbed. The value of the chromic process of treatment of catgut lies in the fact that such gut is hardened and thereby much more slowly absorbed, with the result that very much finer sizes


Tying Catgut.
165
Double Throw Square Knot.
A positive knot under all conditions.
First knot holds while tying the second will not affect results if the throw is strong.
This knot will not slip on wet catgut, will not cut itself as readily as other knots
Single Throw Mutton, Double Throw Top
A good safe knot.
A good knot under ordinary conditions but not good for Wet Catgut cuts itself easily when tying
Single Throw
Square or Flat Knot.
The Error Knot
Single Throw.
Granny Knot.
A mushroom square knot.
Experiments & Tests
C. L. Wallis
165

No. 1—Flat knot.
No. 2—Flat knot pulled tightly.
No. 3—Double-throw knot followed by single throw.
No. 4—Same knot drawn down tightly.

can be used, and consequently the knots hold better and absorb more quickly and evenly. Nature can take care of just so much outside material. It would be advantageous in many ways if the larger sizes of catgut could be eliminated, but in this matter we cannot dictate to our customers and must give the surgeon what he asks for, but we strongly suggest and urge the use of finer strands of chromic catgut in place of larger strands of plain catgut. The strands can be doubled where greater tension is needed to secure safe results.

## MUSTARD PLASTER

Mustard plasters are worthy of more recognition than they get. Their purpose is to draw the blood, gathered in too great a quantity in any part, to some innocent lower surface. Mustard plasters are particularly recommended in urgent cases of chills, hemorrhage and convulsions; in pressure of blood to the head, pneumonia and pleurisy, muscular pains, affections of the chest and in stomach troubles.—*The Monthly Pharmacist.*

## THERE IS NO CHROMIC SILK

Every once in a while we get an order for chromic silk ligatures. This is an absurdity. Absorbable material like catgut may be hardened by chromicizing in order to cause it to resist absorption and remain as a useful ligature for a longer time than if not so hardened. Silk is never absorbed anyhow, so we cannot fathom the mind of a man who orders chromic silk.

## GREEN AND BLACK EFFECTS IN THE HOSPITAL

A unique departure in the matter of the coloring for hospital rooms, operators' clothing, etc., has been inaugurated in St. Luke's Hospital, San Francisco

Owing to the discomfort, from the operator's point of view, of the use of glaring white colors, Dr. H. M. Sherman conceived the idea of using spinach green for the floor and wainscot. The floor and the walls are painted with this color for six feet above the floor, above the level of the six feet of green is white and castor tiling, the ceiling itself being made of a bright buff. This arrangement, Dr. Sherman states, illustrates fairly well the optical environment out in the fields.

In addition to this the whole field of operation was surrounded with black, with the idea of obtaining a surface from which no light whatever could be reflected. Sheets and towelling were of black, the gowns of the operators were of black, as well as the covers for the instrument tables.

Dr. Sherman states that they were found exceedingly satisfactory, and the only objection has been the superstitious fear that people coming up for an operation might consider the somber colors a bad omen, but as a matter of fact they have found no objection to the black dress of the operator or nurses.

## A NEW NON-ABSORBABLE SUTURE MATERIAL

Johnson & Johnson have just recently put upon the market a new non-absorbable suture material which is intended to take the place, in some instances, of silkworm-gut. Silkworm-gut is one of the best known suture materials and is widely used. Its peculiar characteristics make it a very useful suture for certain well-known cases. It is a material which can be boiled in water for sterilization and to soften it. It draws through the tissues very easily because it is so exquisitely smooth. Likewise, after its work is done it can be removed with great ease and little pain to the patient, because of its smooth nature. It is non-absorbable and remains in the tissues in just exactly the condition in which it was put into them. Its structure is peculiar, in that while it is penetrable by boiling water to a sufficient extent to sterilize and to soften it thoroughly, yet its surface is of such a peculiar, smooth, polished character that the growing cells do not penetrate it, with the result that they are not torn and dragged loose when the silkworm-gut suture is withdrawn. As a consequence the patient suffers very little pain and the cells are but litle injured. All this is in great contrast to the relative characteristics of a silk or linen thread, which is, on the contrary, pene-

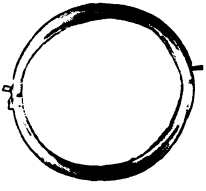
**Operating room, St. Luke's Hospital, San Francisco, Cal., showing the operators and attendants dressed in black, and sheets and toweling of black**

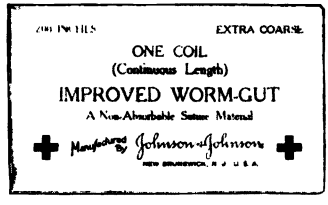
trated throughout with cells, and on account of its fibrous nature becomes firmly imbedded to an extent that makes its removal painful, and to a much greater degree destructive of the healing process.

There has, however, always been complaint of silkworm-gut on account of the shortness of its length. Those who prepare it or sell it have constantly to be in receipt of complaints and inquiries about its length. Such manufacturers and dealers are equally helpless, because the whole trouble lies in the silkworm itself, since it cannot produce a longer strand. This is especially true in the coarser sizes, which are always correspondingly shorter than the finer sizes. It is more or less easy to secure fine silkworm-gut up to seventeen inches in length, but rare to find the extra coarse of a greater length than thirteen inches. This material is prepared chiefly in Spain and Italy, and the extra long gut can only be secured by paying a high price for having it selected out. The manufacturers and dealers in this country do not do this, as there is an unwillingness to pay exorbitant prices, and with this, as with any commercial article, if everyone demanded the long lengths there would not be enough to go around.

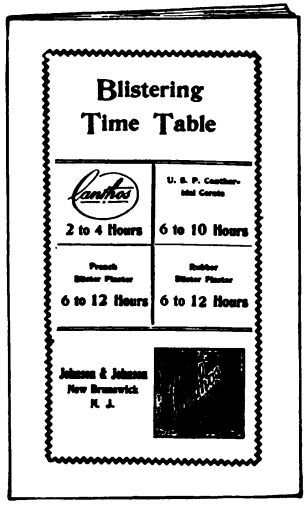
For many years Johnson & Johnson have been desirous of being in a position to put out a substitute for silkworm-gut that could be secured in practically endless lengths. We now are pleased to announce that we can supply a material which we have called by the name "Improved Wormgut," which to a greater or less extent fulfills these requirements. We freely admit that this matter is still in somewhat of an experimental stage, and it remains to be seen whether surgeons will find this Improved Wormgut to be a satisfactory and thoroughly useful article. It is not quite as smooth and glossy as silkworm-gut, but it is very excellent in this respect. It can be boiled in water for a reasonable length of time without visible harm, and it is prepared in continuous lengths of 200 inches.

Johnson & Johnson pack this material,






each coil of 200 inches, in an envelope, and ten envelopes in a box, making 2,000 inches in all in the box. The price is slightly less than that of silkworm-gut, and in order to introduce the material and have it thoroughly tried, we will send to any surgeon who will actually give it a conscientious trial, one coil of 200 inches. The sizes are designated as fine, medium, coarse and extra-coarse, and correspond roughly with the sizes of the well known silkworm-gut.




A copy of this instructive booklet on Blistering will be sent to any physician on request.

## SYNOL SOAP IN CONTAGIOUS DISEASES

It is well to remember that contagion is spread by immediate or mediate contact, and that the only means we have of safeguarding against a spread of disease is by practicing absolute cleanliness. Cleanliness of everything—body, clothes, utensils, in fact all articles from the sick room—is the only prophylactic against infection and epidemics.

The most effective means for cleansing are soap and water, but the soap

Washing utensils from sick room with Synol Soap

must be of a character to destroy bacteria, and Synol Soap—the antiseptic liquid soap—is a bacteriologically tested germicide. Its carbolic coefficient is 0.41.

Synol diluted 1 to 200 (one-half per cent. solution) kills anthrax bacillus in fifty seconds.

Synol diluted 1 to 150 (three-quarters of one per cent. solution) kills anthrax bacillus in twenty seconds.

Synol diluted 1 to 100 (one per cent. solution) kills staphylococcus aureus in fifty seconds.

Synol 1 to 20 (five per cent. solution) kills typhoid bacillus in fifty seconds.

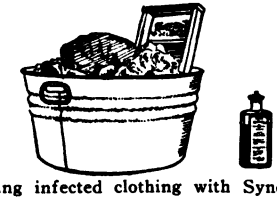
Under strict laboratory tests Synol in diluted solution of from one per cent. to five per cent. kills resistant disease and wound producing organisms in from twenty to fifty seconds.

From the above it will be seen at once that the cleansing and germicidal power of Synol Soap is of great value, and coupled with the attendant friction, which softens and dissolves the dirt and grease, its superiority over any antiseptic solution is evident.

There is no infectious disease from measles to smallpox, from typhoid fever to cholera, in which this valuable germicidal liquid soap should not form an important part of the medicinal armamentarium.

A number of physicians, nurses and attendants upon smallpox hospitals have reported most excellent results from the use of Synol Soap. Synol Soap seems to be particularly applicable for the washing of the nurse's hands, utensils, etc., used around the sick room, and to disinfect discharges contained therein.

Synol Soap is also recommended by the same authorities for the washing of clothing, towels and napkins used by the sick, and these reporters have also observed that it has the very desirable



Washing infected clothing with Synol Soap

property of removing stains from clothing, etc. The usual practice is to immerse the soiled clothing in a five per cent. solution of Synol, afterwards boiling, and then rinsing in a one per cent. solution of the soap, made with warm water.

Particularly good results have been reported from the use of Synol Soap for removal of the scales from smallpox patients, and it is a most excellent practice to substitute Synol for the ordinary antiseptic soap used in bathing all such sufferers. Two or three baths with the use of this soap removes all scales, disinfects them and leaves the skin smooth and clean. The method of using Synol in the bath is: first, to wet the skin with a brush or wash cloth, then sprinkle on the soap, using a brush or cloth for scrubbing.

In the sick room, hospital wards, etc., Synol Soap is an excellent article for scrubbing floors, woodwork, furniture, etc. Both disinfection and thorough cleansing are accomplished by its use. For this purpose a solution containing three per cent. of Synol is amply sufficient.

Private homes require the greatest care against spread of disease. The more or less general visitation of the sick room by members of the household, the carrying to and fro from room to room of articles of food for the patient, and the general indifference to antisepsis by those who do not realize its importance, makes it exceedingly necessary that Synol Soap should find a place in every home.

## HELPS FOR YOU AND FOR YOUR PATIENTS

The Scientific Department of Johnson & Johnson issues a series of bulletins, each dealing directly with one of the more prevalent contagious diseases.

The bulletins give simple information as to isolation, disinfection and general care of patients when contagious disease is present. They do not enter into the subject of the treatment of disease. These bulletins have been found of great value during epidemics, and many health boards have used large numbers for distribution.

They are intended to supplement the work of the physician by explaining to the families of patients what to do in order to prevent the spread of the contagion. The following is a list of the bulletins:

No. 28—Diphtheria Bulletin, illustrated, eight pages.

No. 29—Typhoid Fever Bulletin, illustrated, eight pages.

No. 38—Meningitis Bulletin, illustrated, eight pages.

No. 39—Scarlet Fever Bulletin, illustrated, eight pages.

No. 40—Measles Bulletin, illustrated, eight pages.

No. 56—Consumption Bulletin, illustrated, sixteen pages.

No. 57—Smallpox Bulletin, illustrated, showing typical forms of smallpox, hints on vaccination, nursing, etc.; sixteen pages.

No. 43—Whooping Cough Bulletin, illustrated, eight pages.

No. 18—A Book with a Mission—Illustrated booklet of forty pages, giving brief suggestions applicable to all the more contagious diseases.

A complete list of bulletins neatly bound together will be sent to any physician on receipt of a two-cent stamp.

Where a supply is needed for health board distribution they may be obtained by addressing the publishers:

JOHNSON & JOHNSON, New Brunswick, N. J.

## A FULL POUND OF COTTON

Red Cross Absorbent Cotton is put up full weight; that is to say, every package contains the net weight of cotton as marked on the outside of the package. In other words, in a pound package of cotton there is a pound of absolutely perfect cotton fibre, exclusive of the weight of tissue or other wrappings. Likewise every other size package, even to the smallest ounce or half-ounce, contains the full net weight of cotton over and above the weight of the wrapper, carton, etc.

This point should be borne in mind when buying Red Cross Cotton. You can rest assured that you are getting the full weight of cotton asked for in each and every package of the Red Cross brand.

Red Cross Cotton is put up in the following sizes:

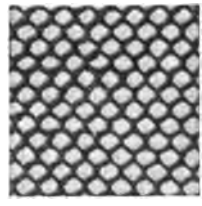
Half-ounce, ounce, two-ounce, quarter-pound, half-pound, one-pound.

In each size the cotton is completely encased in tissue paper; thus it is entirely protected from dust, dirt and infection whether in or out of the carton. Further than this every fibre is perfect—perfect in absorbency, sterility, cleanliness—absolutely pure cellulose fibre.

The buyer always gets the full weight of cotton.

# Small but Important

Here are two rather new items which have been added to our list. The first is a very small thing—just a gauze bandage to fit the finger. The place it fills, however, is one of importance. The bandage is three yards long and one inch wide, and already has attained a large sale.



The second item is Johnson's Rubber Mesh Protective. This is a coarse netting, rubber coated. It is used in the treatment of burns and denuded surfaces, where the frequent removal of dressings produces irritation, with resulting pain and delayed repair of the injury. It is usually applied directly to the surface under the dressing. By this method the dressings can be removed at will, without pain or damage.

The Protective is put up in pieces one foot square, each piece in a double paper wrapper, and sterilized.

Suggested uses for the Rubber Mesh Protective have been as follows :

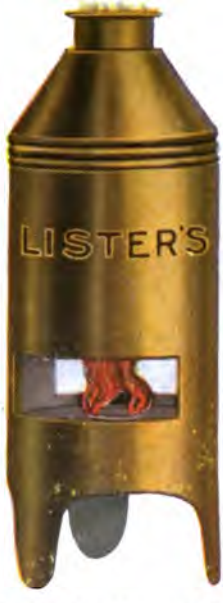
1. Placed over a clean incision it allows the outer dressing to take up the discharge without adhering to the skin ; hence no trouble to remove them at the first dressing.
2. To cover Vaccination Inoculations.
3. Varicose Ulcers.
4. Skin Abrasions.
5. Frost Bites.
6. Crushed Limbs.
7. Bed Sores.
8. As a cover for Nasal and other Tampons.

JOHNSON & JOHNSON

New Brunswick, N. J., U. S. A.

## "Angels of cleanliness."

**Modern antisepsis and disinfection means effective cleanliness. Cleansing agents have been termed "Angels of Cleanliness."**




**Lister's Fumigators give (nearly) 100% efficiency. Handy and safe.**

SYNOL SOAP
GERM DESTROYING
FOR THE
TOILET AND BATH
AN EXCELLENT SHAMPOO
For the complexion, hair and scalp. Softens and preserves the skin.
SURGEON AND NURSE
For sterilization of hands, cleansing and disinfecting the sick room.
Johnson & Johnson

**A 3% solution kills infecting and disease-producing organisms in two minutes.**

## Don't spit. Use a Sputum Cup.

**For the pocket.**

**With removable cups.**

**Pocket form.**

Series VII

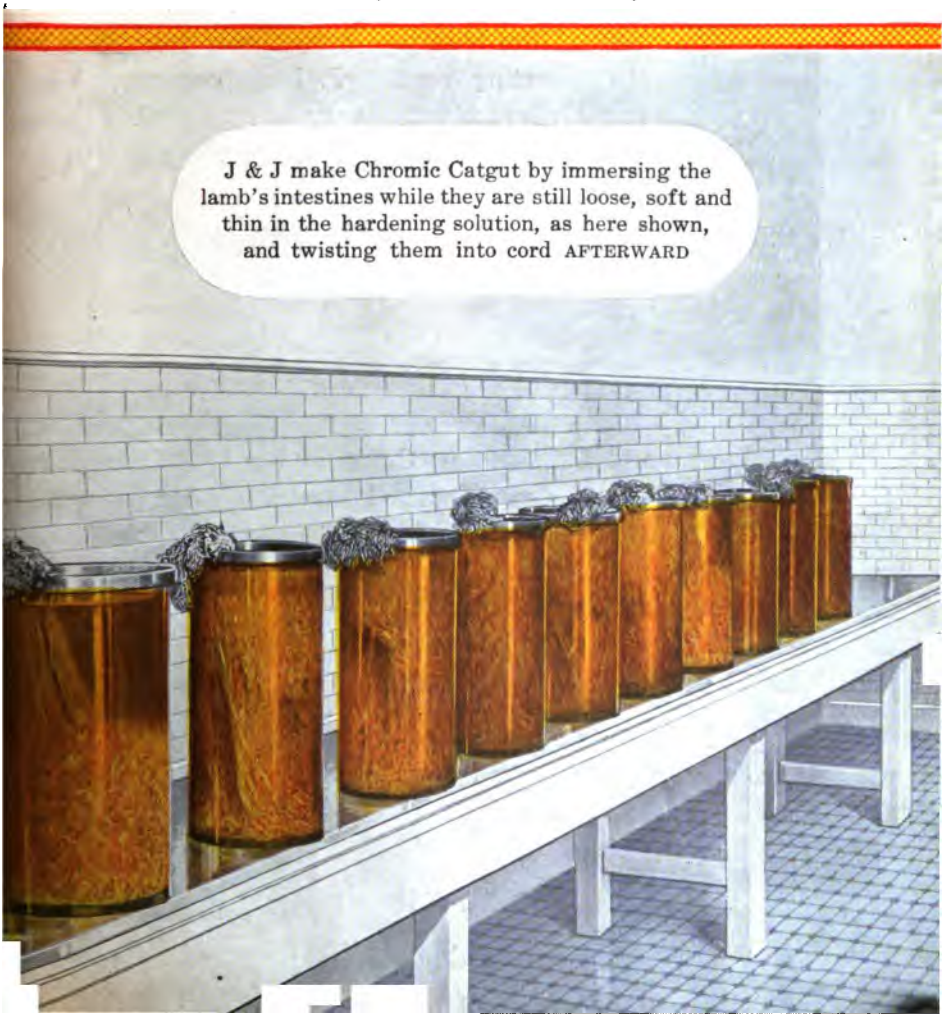
Number Five

FEB 19 1916

# RED CROSS NOTES

PUBLISHED BY

Johnson & Johnson
NEW BRUNSWICK, N. J., U.S.A.



J & J make Chromic Catgut by immersing the lamb's intestines while they are still loose, soft and thin in the hardening solution, as here shown, and twisting them into cord AFTERWARD

# "The Clean Soap"

SYNOL SOAP is the product of a long series of experiments in making antiseptic and medicated soap bases. In addition to its germicidal or germ-killing action it aids in emulsifying the fats of the skin and its hardened secretions.

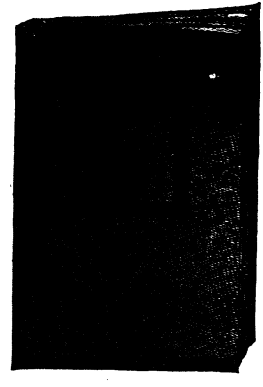
The primary aim in making Synol Soap was to produce a substance for the sterilization of the hands of surgeons and nurses in the operating room. It has, however, been found adaptable to every use to which soap can be applied, in hospital, operating room or household.

We will send a sample, upon request, to any physician or nurse.

---

# Physicians Need This Book

A NEW PHYSICIANS DESCRIPTIVE CATALOG has been issued by Johnson & Johnson, describing and illustrating our principal products. This book of 120 pages is intended to help you in making out your order, by giving you clear information as to the surgical dressings and other goods manufactured by the House of Johnson.



A copy of the Catalog will be sent, postpaid, to any physician, upon request.

Address:

JOHNSON & JOHNSON

New Brunswick, N. J.

# RED CROSS NOTES

COPYRIGHT 1916 BY JOHNSON & JOHNSON

SERIES VII · NEW BRUNSWICK, N. J. · NUMBER FIVE

RED CROSS NOTES

Published by JOHNSON & JOHNSON, New Brunswick, N. J., U. S. A.

Fred B. Kilmer, Editor

This publication is issued from the laboratories of the publishers with the intent to give, in brief, items of interest and reports of original research along the line of the particular branches of the art in which they labor.

Persons receiving *Red Cross Notes* will confer a favor by notifying the publishers of any inaccuracy in the address on the wrapper and of any change of their address.

## WHAT IS CATGUT?

This issue of Red Cross Notes is given over largely to a discussion of the use of catgut as a ligature or suture, and to an exposition of the methods employed to produce a ligature from living tissue that is safe to use, and which will yield itself to the will of the surgeon.

Lamb's intestine tissue split open at one end and twisted at other end into a cord of catgut.

The substance known as catgut is made from the small intestines of sheep. The derivation of the word is not clear, and no one has yet been able to discover any period when it was made from the intestine of the cat. It has, however, been traced back to the early history of musical instruments.

There is a radical difference between preparing catgut for musical instruments and for surgical operations, and Johnson & Johnson were the first to realize this and to adopt measures to give to surgery an absolutely sterile and absorbable catgut ligature.

The surgeon who has been accustomed to using silk ligatures sometimes asks: "Why is silk not better?" The ideal ligature must be absorbed and replaced by living tissue after it has performed its function. Silk, silkworm-gut, horsehair and linen thread are practically eliminated because of this necessity. They may become encysted, but are always found unchanged in the cyst.

A catgut ligature is a portion of animal tissue, and when embedded in a wound becomes an abnormal tissue or graft, which, after it has fulfilled its mission of holding the parts together, must, under the action of the vital processes, be disintegrated, removed and replaced by normal cells. In other words, catgut is a heteroplastic material, and its presence in a wound sets up a chemotactic action of cellular attraction and repulsion, upon all of which the prior method of preparation of the material has a most important influence.

## 1500 B. C. TO 1915 A. D.

**Such Is the Stretch of Time Over Which Ligatures Have Traveled to Present-Day Perfection—Some Interesting History.**

The ligature had to travel a long road before it was established as the best and surest means of checking hemorrhage. The first account of the application of the ligature for this purpose is given by Susrutas in his Ayar Vedas (1500 B. C.) He tied the umbilical cord of the newly born infant with a string eight inches from the navel previous to cutting it. (Senn.)

Celsus (30 B. C.-45 A. D.) applied two ligatures to the bleeding vessel and divided it between them. When he could not ligate in these cases, he advocated the use of the cautery.

Aetius (500-550 A. D.) ligated for aneurysm, excising the sac, although he used a red hot iron to stop bleeding in excision of the breast.

Kirkland (1721-1798 A. D.) asserted that "nothing can more powerfully intersect the course of the blood than a ligature." He advised the use of the ligature made of long "twelve-penny flax" with the ends waxed so that it would pass through the eye of the needle.

Sharpe, a surgeon of Guy's Hospital, in London, suggested the use of the ligature in 1761.

In the early use of the ligature, suppuration was considered necessary in order to facilitate its removal, for which purpose both ends were brought out of the wound. Later, some surgeons cut off the ligature close to the knot, but it was discovered that the ligature, after performing its duty, created an irritation and led to the development of an abscess.

In 1889 Agnew stated that "the knots not being aseptic, act as irritants, retard healing, provoke abscesses and are subsequently discharged from the wound. So the plan of cutting both ends of the ligature close to the knot may be regarded as an unsurgical procedure."

Philip S. Physick (1768-1837) was one of the early users of animal sutures. He used dog-skin and chamois cut into strips.

Sir Joseph Lister introduced the antiseptic or aseptic ligature. Since his day the same kind of violin string gut has been subjected to over one hundred different methods of sterilization in the hands of different experimenters and operators. Experimenters for years struggled with the problem of sterilizing catgut and keeping it sterile, and with few exceptions failed.

Sterilization began, in these methods, with the twisted cord of dirty catgut. The intestine had been removed in the slaughter-house, twisted into a cord and then dried, carrying with it the products of decomposition and other putrid matter that might be present around the slaughter-house in which it was made. This is the material that is sold to musical instrument dealers and to hospitals who sterilize their own ligature material, as well as to dealers in surgical supplies who in turn retail it to hospitals.

The catgut made by Johnson & Johnson is an exception to this general rule. They handle the raw intestines, clean them, wash them in a sanitary laboratory in their own manufacturing plant. The Johnson & Johnson catgut is treated before twisting to make the cord, after twisting and again in the container after sealing. This modern method places in the hands of the surgeon fresh, clean, sterile, strong gut, safe to use.

---

—Catgut strands do not make a good drain for wounds; they tend to swell and occlude.

## STERILIZING LIGATURES

By Dr. E. Reide

A great deal of thought and confusion, both more or less unnecessary, have attended the preparation and handling of ligatures before use in the operating room. We refer particularly to ligatures which are bought sterile and ready for use, and not to the "home"-prepared variety.

Due to the unexplained causes of wound infection, for which, in most cases, the sterilization process is not directly responsible, some surgeons have been led to believe that boiling of the ligatures before using, especially those which are sold in glass tubes, will effectually remove dangers from such a source. This is not a routine practice in most institutions, nor is it absolutely necessary. Boiling serves no particular purpose, other than that it may affect adversely the strength of the ligature inside of the tube. A tube is usually broken in a towel before use, and the strand dropped out. In this way it can be used with unsterile contact.

Of what avail is it, then, to boil the glass. To be safe, however, several antiseptic solutions may be used, in which the ligature tubes may be immersed and allowed to lie there until used. Corrosive sublimate solution of varying strengths is good. Twenty-five per cent. tincture of iodine solution is an excellent antiseptic and grease solvent. Synol Soap, ten per cent. solution, or stronger, will do all that is necessary. It will sterilize, dissolve fats and render the handling of the tube absolutely safe. Alcohol is also very effective.

Boiling may be resorted to, but it is an entirely unnecessary expedient. The suggestion that tubes may be boiled serves no other purpose than to increase the mental safety which the word "boiling" naturally implies, and it further adds another step in handling, which interferes with much-needed simplicity in the operating room.

Catgut ligatures after being removed from the tubes may be immersed in alcohol until called for by the surgeon. This straightens the strands, increases the pliability and simplifies the threading.

Note by the Editor: The ligatures of Johnson & Johnson may be boiled or steamed with instruments if such a process is deemed necessary.

## WAR SURGERY

Dr. Alexis Carrel, of the Rockefeller Institute, who has been given exceptional facilities for observation of the workings of the sanitary department at the front, and in the different hospitals during the progress of the European war, is quoted in the public press as saying that thus far surgeons have not learned much from the war. The preconceived theory that the greater speed of bullets, creating intense heat, would cauterize the wound and prevent infection, has been exploded. The speed of the bullet varies with the range of fire, and at long range its reduced speed is insufficient to create the necessary heat.

When all conditions are favorable the bullet wound is less serious than formerly, but in this war the conditions are seldom favorable. The consequence is the infection of the vast majority of wounds—the worst cases being caused by shrapnel. Anti-tetanus serum has been quite effective. The proportion of soldiers succumbing to their wounds in the hospitals is regarded small, considering the difficulties offered by the general infection of wounds.

—The ideal ligature can only be obtained by treating catgut before it has been twisted into a solid cord or string.

## TIME OF ABSORPTION OF CATGUT

By E. Harrison, M.D.

In our surgical work the employment of the proper size ligatures, and the time of absorption of hardened and plain catgut in the tissues, has always been considered an important factor. The opinion is prevalent that unhardened catgut is absorbed too readily for usefulness. Nevertheless, experiments by Dr. H. Cabot, of Boston, with plain and chromicized catgut, seem to prove the contrary. He says:

"The process of absorption of catgut takes place by infiltration with round cells and polynuclear leucocytes, and the rapidity of the process depends largely upon the blood supply of the part. In tissues of poor blood supply and consequent low vitality, as subcutaneous tissues and fascia, the rapidity of infiltration is much diminished and absorption is therefore markedly slower, while in very vascular tissues the most rapid absorption takes place. These facts should be borne in mind in estimating the true durability of absorbable materials."

After experimenting with plain and chromicized catgut he concludes as follows:

"(1) That in rabbits chromicized catgut, No. 1 size, is retained longer than is desirable in suture material for surgeons use; (2) that plain catgut of No. 1 size is retained a sufficient length of time, that is to say, a minimum of three weeks; (3) that the catgut prepared by dry heat is more rapidly absorbed than that prepared by moist methods; (4) that the time required for absorption increases very rapidly with the increase of size, as No. 2 gut took from two to three times as long to absorb as No. 1."

These experiments have been verified in surgical work. The object desired is the approximation of the parts, and then rapid absorption of the ligature, and while we feel that the ligature itself may be perfectly sterile, nevertheless infection may occur, due to lowered tissue vitality and the presence of bacteria in the tissue itself. If, then, the gut remains in the tissues too long, infection is always possible.

Dr. Pearson, in his work, sums the matter up very intelligently, as follows:

"Owing to its being an absorbable substance, catgut should be employed for surgical purposes whenever and wherever an absorbable material will answer the required purpose, and a little reflection will show that this applies to most cases in which ligatures or buried sutures are used.

"In infected wounds, or in parts that are liable to become infected, an absorbable ligature or suture is the only safe material to use, unless a non-absorbent substance, such as metallic wire, be employed, which cannot itself become infected.

"Where the desired result can be obtained in a short time, it is preferable that the ligatures should undergo rapid absorption, as further retention of the material in the tissues can serve no useful purpose. On the other hand, where the action of the suture is desired for a considerable period, it is necessary to use some material that will resist absorption. We are therefore justified in using this material for the suturing of nerves, tendons, fasciae, muscular strata, the cure of hernia, and even for uniting fragments of bone. In operations on the stomach and intestines, I think it is advisable that an absorbable suture should be used next the lumen, as no one can foretell the ultimate fate of non-absorbable thread which is partially in contact with the digestive juices and partially embedded in the coats of the stomach or intestines."

## CHROMIC CATGUT NAMED

When Johnson & Johnson some years ago discarded the old terms, ten day, twenty day and thirty day chromic catgut, and adopted the terms medium-hard chromic and extra-hard chromic, they gave their chromic catgut fair and safe names. Their research and the experience of surgeons have established the fact that patients do not react alike, and the same can be said truthfully of different tissues, so that it is impossible to prepare catgut which can be said to have any definite resistance expressed in exact terms, such as "days."

They make two distinct degrees of hardness. Under ordinary conditions in muscle the medium-hard chromic catgut, size No. 2, will retain its integrity for from ten to twenty days; the extra-hard chromic catgut will retain its integrity for from twenty to thirty days, or perhaps slightly longer. The surgeon is able to tell at a glance the kind he wants. In most cases the medium-hard chromic is sufficient, but in serous or mucous membranes the extra-hard is generally called for. The larger the strand the longer absorption will be delayed, and this is true especially of the knot. The use of two small strands in place of one large strand is advised wherever possible, so as to avoid large knots which remain in the wound and may later cause irritation.

The tubes containing Johnson & Johnson chromic catgut are made of amber-colored glass to distinguish the chromic from the plain gut—which is furnished in ordinary white tubes of clear glass—and to prevent any mistake where chromic catgut is wanted. The operator, nurse or assistant can readily see at a glance which is chromic and which is plain.

---

—Get our Physicians' List.

## LIGATURE SIZES

*(Contributed)*

An important factor in wound repair, no matter what the anatomical situation, is the employment of the right size ligature. At the outset it seems difficult to formulate a hard-and-fast doctrine as to the proper size in each particular structure, but upon closer study it will not seem so difficult, when the nature of the tissue, the location of the part and the necessary amount of tension and traction are considered.

Ligatures serve only one purpose, namely—approximation of the parts. It matters not whether it be a blood vessel, skin, mucous membrane, muscle or gut, the scheme is to hold the divided structures together until nature performs its own natural approximation. This being so, it is necessary only to use a ligature no larger than is required to serve this purpose.

A ligature at best is a foreign body, and no matter how sterile, it will set up irritation in accordance with the comparative size of the ligature to the part.

A good rule to follow is this one suggested by Pearson, allowing, of course, certain obvious exceptions in some individual instances:

"For ordinary ligatures I use No. 0, and for the smaller vessels No. 1, and for the larger No. 3 or No. 4 for pedicles. For suturing the abdominal parietes, I select No. 1 gut for the inner or transperitoneal suture, and No. 3 for the muscular layers. It is not necessary, as a rule, to use coarser sizes, and when additional strength is required a double suture will answer. To have too many sizes only leads to confusion."

---

—To Lister belongs the credit of having shown the way to the successful employment of animal tissue as a ligature and suture material.

## CATGUT PERFECTED

**Johnson & Johnson Have Solved the Problem of Absorption and Produce the Safest Ligature Obtainable Today.**

For more than a generation Johnson & Johnson have been engaged in the manufacture of catgut, and during that time they have been close students of the subject. Their one desire has been to produce catgut that would not only meet the advancing requirements of modern surgery, but would anticipate them. The result has been that Johnson & Johnson are leaders in the production of surgical catgut.

There is a vast gulf between the finished strand of Johnson & Johnson catgut and the ordinary surgical catgut, the product of a slaughter-house business, and no one appreciates that more than the physician who has given serious thought and consideration to the subject.

Johnson & Johnson were first to realize the danger in the use of the foreign slaughter-house gut. They began a difficult series of experiments which ran through many years, endeavoring to make their own catgut from the raw material, so that they could see and know exactly what it was made from and could carry out the processes under clean, sanitary conditions. They knew that frequently blood, feces and infectious materials were twisted into the strands of the slaughter-house gut; they knew that such material was not suited for the uses of surgery.

They succeeded in producing a catgut that has stood the test, that has proven a great success in the hands of the surgeon. This success has been demonstrated in the tying of the knot where good tensile strength is needed, and by the satisfactory results in absorption and in sterility. Absorption and sterility are considered together because without proper absorption infection is likely to be caused by failure of the knots to absorb, with consequent irritation, even when the catgut itself is sterile.

Johnson & Johnson have solved the problem of absorption by their methods of chromicizing lamb's intestine while in the raw condition, before it is twisted to make the cord. While in this condition it is treated with the chromic hardening solutions, and it is easy to appreciate that while in the soft, thin tissue-like condition absorption of the chromic hardening solution will be regular and uniform. Experiments on animals and in the clinics have determined for Johnson & Johnson just what degree of chromicizing is needed. Controlling the preparation of the gut from the time the intestines leave the body of the lamb until the finished product is sealed in the glass tube and sterilized ready for surgical use, Johnson & Johnson are able to guarantee their catgut to be free from putrid matter, feces or dirt, and are able to stand back of every strand that leaves their laboratory as being sterile and of good tensile strength.

In striking contrast to their method is the old way of preparation, where it is endeavored to treat the hard, dry, finished cord, in which condition uniform absorption of the chromic solution is not to be expected. The regular catgut industry may be all right to give to the world violin strings and tennis racket strings, but it is not a trade suitable for the production of raw material for use in surgery.

In the Johnson & Johnson laboratories attention has not only been paid to the physical condition of the catgut and to its sterility, but the safest and best containers have been perfected for it, so that the suture material will reach the surgeon's hands in an absolutely pure condition.

## THE PATRON SAINTS

Dr. Robert Fletcher in the "Bristol Medical Journal," England, December, 1912, gives an interesting account of the martyrs Cosmas and Damianus as the patron saints of medicine and pharmacy, who, while, next to St. Luke in the point of time, are more generally known as the patron saints of the healing art.

COSMAS AND DAMIANUS
The Patron Saints of Medicine and Pharmacy.

Many miraculous incidents and legends have been woven about these saints, including the grafting of a limb from a person recently dead to a person whose leg had been amputated, thus forestalling by several hundred years the work of Carrel.

These saints were brothers, of Arabian birth, and were educated in medicine. They were martyred about the year 297 A. D. There is still existing in Barcelona a medical society which bears their names. For several centuries September 27th was observed as the anniversary of the martyrdom of these saints, and pictures were exhibited in many drug shops in Europe, some of which are preserved to this day. A number of churches and shrines have been erected in their honor, including one in Rome.

In 1781, Sir William Hamilton, then British Ambassador at Naples, described some strange phallic ceremonies performed at an annual celebration in honor of these saints held at Isernia, a very ancient town in the Kingdom of Naples. During the three-day fetes in 1781, over 1,400 flasks of St. Cosmas Oil were bestowed on the worshippers. Anointing with this miraculous oil was performed by the priests for every kind of ailment, and the flasks were presented to enable the sufferers to continue the treatment after leaving the shrine.

---

## BLISTERING TIME TABLE

Physicians will find a twenty-four page booklet, "Blistering Time Table," issued by Johnson & Johnson, of much interest. Published with a view of acquainting the medical profession with the superiority of Canthos as a blister plaster of standard strength, made of Spanish flies, it contains valuable hints on blistering and gives a complete treatise on when and where to blister, compiled from the latest and best authorities, illustrated. The opinions of physicians of many states who have used Canthos in their practice is given, and there is a chapter on "Cautions About Blistering."

The booklet will gladly be sent to any physician or nurse on application.

## SKIN SUTURES

Dr. Weller Van Hook, of Chicago, gives his method of manipulations for applying skin sutures, which are here set forth:

Silk-worm gut is the best material. If soaked for a few minutes in methyl blue solution it will be seen much more easily. Fishermen, for whom the material was devised, like it best when quite translucent, since the lure is on this account less visible to the fish. The surgeon needs the opposite quality, that of opacity. The material should be thoroughly boiled with the instruments; this makes it soft and pliable and does not seriously affect its strength.

The needle should be a straight Hagedorn, not too large. The skin edges are lifted and slightly rolled outward. The needle is then introduced into the skin at such an angle that when the stitch is tied (a) the edges are approximated without being turned out or rolled in; (b) the skin and the underlying fat-tissues are supported; (c) there are no gaps left between stitches.

The question of rapid and effective manipulation is largely solved by the use of the materials chosen. The straight needle gives the operator constant, accurate knowledge of the whereabouts of the point, and also the power, by the use of the needle as a carrier and lever, to adjust the tissues that are being manipulated.

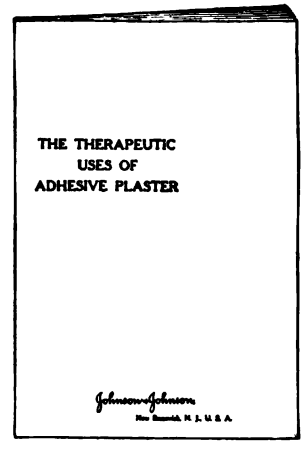
The Hagedorn needle, with its knife-edge point and large eye, passes easily through the tissues, making a clean wound, and is very easily freed of its thread and easily armed again. With a little practice the surgeon can sew up a simple wound as fast as a quick nurse can supply threaded needles. The nurse should stand at the operator's left and, holding a bunch of well trimmed silk-strands in the right hand, she can quickly thread them and either give them into the operator's hands or stick them in a towel near his right hand.

The Hagedorn needles should be sharpened on a small stone and polished with emery before each operation.

## ADHESIVE PLASTER

"Throughout the whole range of the practice of medicine there is no one remedial agent which has so large a field of usefulness as adhesive plaster."

Here is a book issued by our Scientific Department, which gives the salient features of the therapeutic application of adhesive plaster. It is an illustrated monograph containing the gist of contributions of able authorities in this country and abroad. It is a most interesting and instructive book, especially to medical students and nurses, and supplies a want not usually found in the text-book.




A copy of this book will be sent on request.

Address: Scientific Department, Johnson & Johnson, New Brunswick, N. J.

—Good service demands good materials.

## HIGHEST HONORS AT FRISCO

The only gold medal awarded to any exhibitor of medicinal or surgical dressings or dental specialties at the Panama-Pacific International Exposition at San Francisco was given to Johnson & Johnson. The award is gratifying to the House of Johnson, and we believe that it is pleasing to that great and growing fraternity of physicians and surgeons who have become accustomed to placing their fullest confidence in the products coming from the Johnson & Johnson laboratories.

As all physicians know, it is no novel experience for Johnson & Johnson to have the superlative stamp of merit placed upon their products when they come into competition with the products of the whole world. It is the natural result of the Johnson & Johnson methods. During their whole existence the aim of Johnson & Johnson has not been to produce the cheapest article on the market, but the best. Their ambition has meant increased cost of production through the employment of the best experts, through the system of double tests, through the unusual care taken to see that nothing but a perfect product goes forth with the Johnson & Johnson label upon it.

The award of a gold medal now and then means nothing to the physicians, who have learned by experience that their confidence has never been misplaced, but in these days of blatant boasting, of exaggerated claims and clever exploitation, such an honor as has been conferred upon Johnson & Johnson by the San Francisco Exposition means much to the public. The prize-winning exhibit embraced the whole line of Johnson & Johnson products, and the judges by their award proclaimed the J. & J. line as supreme in its field.

## HANDLING LIGATURES

**J. & J. Tubes May Be Sterilized Before Being Broken—Some Things to Be Avoided.**

The Johnson & Johnson ligature is delivered to the surgeon sterile, and in the operating room it must be received by the surgeon from its tube without danger of infection. Before the tube is broken its exterior should be sterilized, on account of having been handled, and grease from the hands, containing bacteria, may be left on the tube. A solution often used for this purpose is Harrington's Solution, consisting of: water, 10 fluid ounces; alcohol, 20 fluid ounces; hydrochloric acid, 2 ounces; bichloride of mercury, 12 grains.

One of the difficulties surrounding the use of cold antiseptic solutions for disinfecting the exterior of ligature tubes is that the tubes float and the ends protrude above the liquid, and consequently that part of the tube is not sterilized. If cold antiseptic solutions are used, the tubes should be weighted down by means of a perforated glass disc heavy enough to hold them under the solution. When the tubes are to be used they should be removed from the jar with sterile forceps and placed in a sterile dish from the steam sterilizer, filled with fresh antiseptic solution and kept there until taken out by the sterile nurse or operator, to be broken later in a piece of sterile gauze.

A common method for sterilizing the exterior of ligature glass tubes is by boiling them with the instruments. This method eliminates one operation, the instruments having to be boiled anyhow.

After the tubes are removed from the boiling water and allowed to cool they should be broken in sterile gauze, the suture removed and, if required by the surgeon, dipped in sterile water in a sterile dish and handed to the surgeon. Dipping in an antiseptic solution or sterile water is done to soften the catgut, so that it will be more pliable and more easily tied.

In the "boilable" tube prepared by Johnson & Johnson is the most pliable and the strongest catgut suture that has ever been offered to the surgeon. This has been demonstrated thousands of times in the operating rooms of many hospitals in tying knots, where comparisons have been made with other brands of "boilable" tubes. Johnson & Johnson have been able to secure superior results because they control the entire process of preparing the catgut, from the raw material to the finished product, a fact which has won recognition from surgeons all over the world. The Johnson & Johnson catgut can be tied in a perfect knot, and is less liable to break than other catgut, some of which is so harsh and brittle that it snaps when the surgeon attempts to pull the knot down tight.

And now for a word of precaution against a dangerous practice sometimes allowed in hospitals and operating rooms: A sterile towel taken from the steam sterilizer is laid upon an instrument table which is not absolutely sterile, and then the tubes of suture material are broken over the table, the sutures removed and laid upon the table cover. The chloroform or alcohol in the tubes strike through the sterile covering, wets the top of the table, and bacteria from the table are immediately drawn back by absorption through the covering, thus reinfecting the sutures. This danger can be avoided by using a piece of rubber sheeting or dam, sterilized in the steam sterilizer, between the table and sterile cloth covering. Of course, the sutures could as well be placed in a small sterile dish if this is preferred.

## REAL MISSIONARIES

**This Book and These Pamphlets Will Assist Physicians to Teach the Public How to Control Contagious Diseases.**

"A Book with a Mission," the mission being to show that contagious and infectious diseases may be controlled, prevented and ultimately eradicated by systematic measures, has been issued by Johnson & Johnson. Technical terms have been avoided, and the book has been made so plain and so convincing that it will appeal to the general public—to those who most need instruction. The methods suggested for dealing with communicable diseases are the most simple, yet the most effective for isolation and disinfection. They can be successfully carried out under all conditions and circumstances. They have in many instances been directly contributed and sanctioned by the highest authorities on sanitation.

The suggestions in the book will also prove of value to physicians, nurses, health officers and sanitarians. Health authorities will find that the judicious distribution of this book in their various localities will materially aid them in advancing the health standard of their municipalities.

Johnson & Johnson have also published a series of pamphlets and bulletins upon the subject of contagious diseases, all written from the standpoint of the best authorities upon sanitation, and embracing the latest and best known methods used by health boards in combating contagious and infectious disease. The directions given in these bulletins are plain and simple, yet the most effective of all known methods. They include methods of isolation, prevention of the spread of disease, hints on nursing in contagious diseases, and methods

of disinfection. In times of epidemics it would be an act of good judgment to obtain copies of these bulletins and distribute them throughout the community. The pamphlets are as follows:

No. 28—Diphtheria Bulletin, illustrated, eight pages.

No. 29—Typhoid Fever Bulletin, illustrated, eight pages.

No. 38—Meningitis Bulletin, illustrated, eight pages.

No. 39—Scarlet Fever Bulletin, illustrated, eight pages.

No. 40—Measles Bulletin, illustrated, eight pages.

No. 43—Whooping Cough Bulletin, illustrated, eight pages.

No. 56—Consumption Bulletin, illustrated, sixteen pages.

No. 57—Smallpox Bulletin, illustrated, showing typical forms of smallpox, hints on vaccination, nursing, etc., sixteen pages.

No. 44A—Sick-Room Rules. Specific rules printed on a card intended to be hung in the sick room when contagious diseases are present.

Copies of "A Book with a Mission" and of the pamphlets will be furnished to physicians, nurses, health officers and others upon application to the publishers: Johnson & Johnson, New Brunswick, N. J.

Lamb's intestine in the loose condition, being immersed in the chromic hardening solution. Two thousand feet of intestine to two gallons of solution.

Portion of room where [illegible] twisted to

## PREPARING CATGUT

### It Passes Through Seven Stages Before It Reaches the Hands of the Surgeon.

Johnson & Johnson alone have done away with the practice of purchasing the finished strand of catgut made at the slaughter house. They now control the making of their catgut from the time the intestines leave the bodies of the sheep until they are ready for the surgeon's use as ligatures. Consequently, Johnson & Johnson alone are able to produce a ligature or suture free from the faults of ordinary catgut, and one that fulfills all of the requirements of modern surgery, one in which the original strength is not lost.

The processes under which catgut is prepared in the Johnson & Johnson laboratories are as follows:

1. The immediate disinfection and cleansing of the raw intestines directly after they leave the sheep. The removal of the various coats of the intestines, [illegible] the submucous coat.

Portion of ligature labor[illegible] catgut and pla[illegible]

2. Disinfection and chromicizing of each gut before twisting to make the strand.

3. Twisting the guts into a strand.

4. Testing the strands for strength and placing the gut string within the envelope or tube.

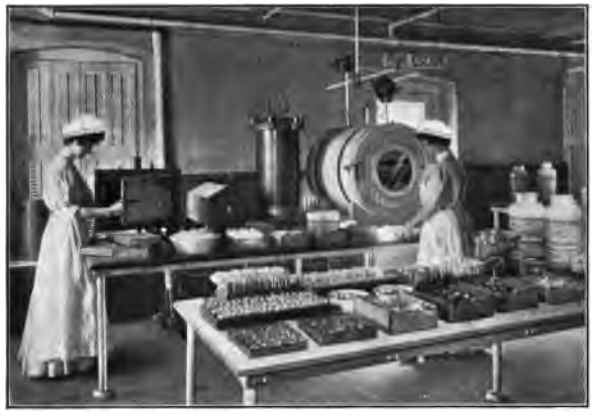
5. Final sterilization after the tubes or envelopes are sealed.

6. Bacteriological test made of each lot.

7. Packed in boxes and the test num-

stines are disinfected and
s of catgut.

ving the handling of raw
ages preparatory
n.



Portion of the catgut sterilization room, showing apparatus for thermo sterilization.

ber placed on each box containing one dozen ligatures.

Experiments have shown these processes necessary to retain the strength and other natural characteristics of the gut. Other methods have left the gut weak, and often brittle. Johnson & Johnson are the only manufacturers who have carried on the great amount of research necessary to work out methods; who have gone to the expense of equipping an experimental laboratory and selecting so large a force of trained expert operatives. They have the most expensive and modern catgut laboratory in the world.

Directly connected with the ligature laboratory is the bacteriological laboratory, from which the whole operation is directed. Every step in the ligature preparation is checked, and no hit-or-miss methods are tolerated. Each operative concentrates on one feature of the process up to the final sterilization in the sealed tube or envelope.

The result is a healthy, normal, animal tissue, sterilized, aseptic and unchanged in character, hence absorbable without reaction or disturbance of the wound-healing process. An examination of a strand of Johnson & Johnson catgut shows a solid, firm texture of the cord, translucent, the twist hardly visible—the result of using clean intestines from lambs and of having them in right condition when twisted.

The Johnson & Johnson method of preparing catgut opens a new era for this product and is the beginning of the most important step in catgut preparation since the classic work of Lister.

## SOURCES OF INFECTION

**While Suture Material Comes In for Its Share of Blame, It Is Not Always Guilty of the Charge.**

*(Contributed)*

**This little article was recently sent in for publication. We believe it will be interesting to the profession.**

The desideratum of surgery is primary union and an aseptic wound field. While this may be the expectation of every operator, there are times, nevertheless, when, in spite of the most careful preparatory sterilization, infection does occur. Then we look about for the cause. It is human nature to shift responsibility. Instruments and operating materials are suggested; the assistants and nurses are considered possibilities; rubber gloves unsterile; the operating field insufficiently prepared by the attendant, and last, but by no means least, the suture material comes in for its share of blame.

Catgut, the most frequently used suture, is made from sheep's gut and is therefore open to suspicion. But it should be remembered that when catgut leaves the manufacturer as sterile gut, it is undoubtedly sterile gut. The reasons for infection are elsewhere.

Dr. J. B. Morgan, of Augusta, Ga., in the American Journal of Surgery, sums the matter up precisely as follows:

"On the other hand, infections occur where the operator is at a loss to account for the cause. On such occasions we find it convenient and satisfying to our pride to invent some scapegoat. It is sometimes more agreeable to fix the blame upon some inanimate rather than some animate object. Therefore, when a wound that ought to have healed by first intention is found to be filled with pus, it is quite the custom to vent our spleen upon the dressings, instruments or sutures.

"Since it is very probable that the one who prepared the dressings and instruments is present at the operation, and the one who prepared the sutures is not, it naturally follows that some of our aseptic mistakes are boldly ascribed to faults in the preparation of the suture material.

"That the material used for sutures is sometimes responsible for the infection, I think, cannot be denied, but that the preparation of sutures is as defective in surgical cleanliness as many surgeons would have us believe, I do not think is confirmed by the facts as shown by observation and experience.

"Nearly every surgeon of note, and nearly every large hospital in the country, has a plan for the perfect sterilization of catgut, but the fact that so many methods have been used is a strong proof that no one of them has proven entirely satisfactory."

Leaving aside the possibilities of wound infection by instruments or other external means, we will discuss only the reasons why sterile catgut sometimes causes suppuration. One of the conditions which favor infection is the presence of bacteria in the tissues. Germ-free tissues are rare, and if thrown in contact with perfectly sterile suture material the latter becomes a most fertile field for germ growth.

Tissue bruises, due to rough handling, tying of hard knots, too many knots, over-size ligatures, all tend towards germ growth and infection.

Dr. H. Cabot, of Boston, says: "We not very infrequently see catgut and animal tendon sutures discharge in sinuses, showing that they have become foreign bodies, and that their absorption has been too slow to counterbalance the tendency of the tissues to sequestrate foreign material.

"I have seen reason to believe that

some at least of the wound infections which have been thought due to the use of infected material have in reality been due to the lowered vitality of tissue included in too tight sutures. Too great tension on the sutures, while not perhaps a primary cause of infection, is undoubtedly a predisposing element, and may be avoided by the use of suture materials which will not stand too great a strain."

Pearson in his book on "Modern Surgical Technique," quotes in full the noteworthy experiments of Ewald. It seems that the catgut, in the process of absorption, liberates a *toxin* which has power of causing suppuration in quite healthy tissues.

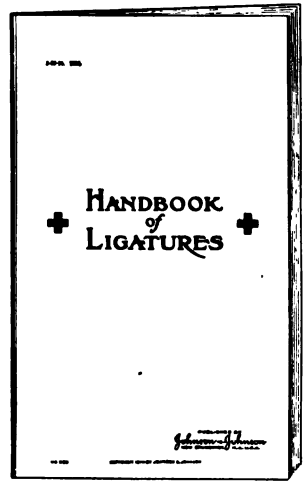
In conclusion, all these factors demonstrate that it is not always the catgut which causes the troublesome infection, and every surgeon must realize that all the manufacturer can do is to furnish a ligature which is sterile, pliable and of the proper tensile strength.

---

## HANDBOOK OF LIGATURES

Johnson & Johnson have issued a handsomely illustrated booklet of forty-eight pages covering the subject of ligatures. It is called the "Handbook of Ligatures" and should be in the hands of every physician. The booklet, by text and picture, shows the whole process of preparing catgut ligatures from the moment it leaves the sheep until it is sealed in its container ready for the surgeon's use.

The method of treating absorbable ligature material with hardening agents to make it more slowly absorbed—a matter of general interest to surgeons—is fully explained. The method of making bacteriological tests, the new and rational scale for the measurement of catgut and the complete set of standards for determining tensile strength of ligatures are set forth in detail.




An informing article on Catgut Absorption, prepared by the Scientific Department of Johnson & Johnson, and illustrated with nine rabbit sections, an article on the Resorption of Catgut, instruction as to the proper way to tie the knot and information about raw catgut, kangaroo tendons, silk ligatures, horsehair sutures, silkworm-gut and other facts about ligatures are contained in the book.

A copy of the booklet will be sent to any physician upon request to Johnson & Johnson, New Brunswick, N. J.

---

A new Physicians' List, 125 pages of illustrations and descriptions, has been published by Johnson & Johnson. Every physician will find it interesting and helpful. Send to Johnson & Johnson for a free copy.

---

—First aid workers, please send your names and addresses to the First Aid Department of Johnson & Johnson.

## DAY OF IODINE

**Value of Iodine as a Wound Dressing Is Live Topic Today—A New and Safe Container.**

One of the most fruitful sources of discussion of recent years has been the topic of the value of iodine as a substance for the treatment of wounds, both in regular surgical practice and in first aid and accident work.

From whatever point of view we examine this subject, it is plainly evident that iodine is having its day, but whether or not it will stand the test of experience remains to be seen. There is no question whatever, though, that it has made for itself a very strong position, and there is no topic about which recent writers use stronger or more positive language.

Iodine for many years has been known and used, especially as tincture of iodine, both by the medical profession and to a great extent as a household remedy. Much has been expected of it, no doubt, that was impossible, but it is a strange circumstance that in spite of its common use it has been so long in coming into its own.

Away back in 1811 a soap boiler in Paris, so it is stated, noticed the action of Kelp liquors on copper boilers, and by this means iodine was discovered, it being made from Kelp, a sea plant.

Major Woodbury, of the U. S. A. Medical Corps, was one of the first of the modern advocates of iodine for all surgical purposes. As a result of a great deal of experience with its use, Major Woodbury declares as his opinion that it is the long-desired ideal antiseptic, being cheap, easily obtained and efficient in high dilutions. He states that it does not damage tissue, even where vitality has been reduced; also that it has been invariably successful as a germicide under all conditions, and though it has great power of tissue penetration, he has never seen a case of poisoning. He furthermore states it can be used to disinfect the area of operation without previous preparation, also the hands of the surgeon, and that a good surgeon with tincture of iodine will show as good results almost anywhere as can be had in the finest op-

The New Iodine Container.

erating room served by the most scrupulous attendants. This is certainly the highest possible praise and would seem almost as though it were the statement of a fanatic.

Many other surgeons have expressed themselves as not at all convinced of the value of iodine under any such conditions as are suggested above, and it has freely been stated that those who trust wholly to iodine and do not apply to their surgical cases the extreme cleanliness heretofore in use do not get first-class results, and that there is arising a serious situation due to those advocates of iodine who are throwing over the doctrine of a high state of cleanliness and are pinning their faith on iodine, thus backsliding from the experience of modern operators with whom cleanliness is the first consideration.

Hirst states in a recent article that he does not use iodine because: 1st. In strengths of less than 12 per cent. it will not sterilize the skin, that such a strength will cause severe desquamation, and weaker solutions are not to be depended upon. 2d. It is an intense irritant to the peritoneum. It will cause

extensive adhesions, and has caused fatal intestinal obstruction. 3d. Healing of the wound is not uniformly clean as it is with other methods of preparation. This is the expression of opinion of one of the highest types of the modern sterile operators.

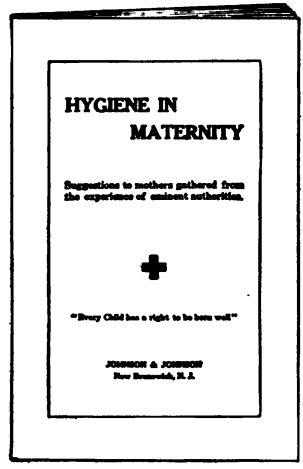
On the other hand, we have an article by Dr. F. T. Fort, in the American Journal of Surgery for 1915, in which statements are made that show him to be a complete convert to the cause of iodine, inasmuch as he uses the tincture in large quantities right in the abdominal cavity, in quantities such as pints, quarts, and even gallons.

Whatever the opinions pro and con may be, there is no doubt whatever that there is a large demand for iodine as a wound dressing, especially in first-aid work, and for application to accidental lacerated wounds, such as are brought into special prominence just at this time on account of the war in Europe.

One of the most difficult problems for the first aid man or for the physician outside of the operating room is the safe transportation of tincture of iodine. Glass-stoppered bottles are uniformly unsatisfactory on account of the probability that the stopper will either drop out or else will stick in so that it cannot be removed. Iodine has the unfortunate peculiarity that it soon corrodes ordinary cork stoppers and also rubber stoppers.

Johnson & Johnson have been working for some time to devise a satisfactory container for tincture of iodine, especially for first aid and emergency work. There are on the market pointed tubes of sealed glass containing iodine, and in use the points are broken off. Johnson & Johnson wanted something better than this, so that an aseptic solution, brush and tube could be used immediately by the operator. The Iodine Applicator J. & J., which has just been put on the market, fulfills all the requirements of the modern surgical operator, even when used by the mere amateur first aid person.

It consists of a glass tube of iodine solution, constricted at a point near the center and scratched in the constriction so that it can readily be broken at that point. Inside the tube, and hence constantly immersed in the iodine solution, is a swab or brush. When the tube is broken in half at the scratch mark the brush is found to be fastened to one of the halves of the tube, which acts as a handle. The swab or brush wet with the iodine solution may then be applied to the wound or other surface to be treated.




Many doctors make a practice of placing a copy of "Hygiene in Maternity" in the hands of expectant mothers. It contains directions for diet and general care of patient from beginning to end. It is a manual of simple advice. Copies of the book will be sent free on request.

—Every doctor should keep in close touch with the first-aid-to-the-injured movement. First Aid Catalog, No. 110, will keep doctors informed. Send to Johnson & Johnson for a free copy.

## PERFECT KNOTS

**They Are Possible With Johnson & Johnson Catgut, Which Is Twenty Per Cent. Stronger Than Most Catgut.**

The complete success of an operation may depend upon the tying of the knot in the ligature. Realizing this, Johnson & Johnson have not only studiously devoted themselves to producing a ligature superior for sterility and absorption, but one which produces the best knot in the hands of the skilled surgeon. When the surgeon has the Johnson & Johnson catgut in his hands he will note that it "runs well and smoothly" while tying, and that the knots slide down firmly, so that when he begins to feel the tension on the strand he knows the knot is tied. And this is a great satisfaction to the surgeon under the strain of performing a serious operation.

Johnson & Johnson have given a great deal of attention to the question of strength, and today are producing catgut from their laboratories that is stronger than other makes on the market. The secret of the strength is in the handling. Of course catgut cannot be expected to possess the strength of wire. At the very beginning, when the intestine is removed from the sheep, it will stand only about three pounds' direct pull; when twisted and dried to make a cord, this same intestine (the submucous coat) will be broken only by a direct pull of from eighteen to twenty pounds, and on the knot it will average about nine and a half pounds. That is why we test all gut in the knotted condition rather than by the straight pull.

Experience has shown that nine pounds is enough tension for any knot while ligating, for as much tension as this would in most cases strangulate the tissues. Strangulation is one of the causes of infection resulting, as it may, in a local necrosis which affords a culture nidus for the growth of bacteria present in nearly every wound, or which later may gain access to it. When a ligature is applied to a vessel or a suture is used for the coaptation of two surfaces, a certain amount of strangulation of tissue cannot be avoided. The germicidal properties of the adjacent tissue-cells and blood-plasma prevent more or less the development of bacteria. As these protective forces are limited, care must be taken not to strangulate too much.

The surgeon who uses just enough tension, therefore, will have better results than the one who pulls his sutures

1. Failure to bring down second throw on the square knot—gap between throws.

2. Same knot tied correctly—flat and tight.

3. Failure to bring down the second throw. First knot double throw; second knot single. Gap between them.

4. Same knot tied correctly—flat and tight.

too tight and impairs capillary circulation, producing a tendency toward necrosis.

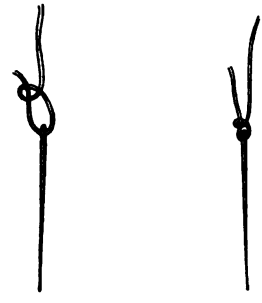
There is a tendency among some physicians to expect too much of catgut, and in their hands the gut often breaks because they pull too hard on it, tie the knot with short jerks and saw on it before letting go of the ends. The surgeon should not expect the impossible. There is a limit to the amount of tension that catgut will withstand. Nature has fixed that limit. Most likely the surgeon who is always breaking his catgut is using too much tension.

There are occasions, however, when there is a flaw in the catgut, infrequent to be sure, but very annoying to a painstaking surgeon. Johnson & Johnson catgut is inspected for such flaws, and the gut which reaches the surgeon will be found from twenty to thirty per cent. stronger than most of the catgut on the market. It represents the utmost at the knot. Johnson & Johnson are able to accomplish this because they control its manufacture from the time it leaves the animal to the finished suture, and the tough, flexible qualities are always kept in mind and aimed at. The ligature contains the strongest part of the intestine—the submucous coat—and is chromicized in its lose, soft condition.

## SECURING CATGUT ON THE NEEDLE

The difficulty encountered by surgeons, due to the slipping of catgut from the eye of the needle at very critical times, has caused Dr. F. H. Jett, of Terra Haute, Indiana, to devise a method of securing catgut to the eye of the needle which will prevent slipping. The accompanying illustrations will show two methods by which the ligatures are secured.

One method shows a loop knot, very easily made, which, however, forms quite a fair-sized knot at the needle's



An easy loop knot.

eye, and might be apt to tear the tissue.

The second method, as shown by Figs. 1, 2 and 3, by which the needle is drawn

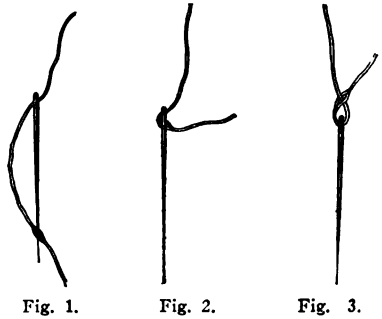


Fig. 1. Fig. 2. Fig. 3.

through an untwisted part of the catgut, would seem to produce a better result, and be just as effective as a larger knot.

Both of these methods, however, display a new principle, in which the profession might well be interested.

## ATTENTION!

All doctors who teach first aid, and all other instructors of such classes, are requested to send their names and addresses and names of their organizations to First Aid Service Bureau, Johnson & Johnson, New Brunswick, N. J.

"Your Handbook of Ligatures is a gem," writes a Southern doctor.

---

"Your trademark is so known and recommended here that in my clinical service I use no other material than that manufactured by you."—Dr. Manuel F. Obregon, Cartagena, Republic of Colombia.

---

"Your Synol Soap is my mainstay as a detergent and antiseptic. Especially useful do I find it in my obstetric work, and so efficient has it proven that I almost never have use for any other antiseptic in gaining personal asepsis and maintaining a reasonably sterile field of operation."—Dr. F. H. Plummer, 261 Chestnut Street, Chelsea, Mass.

---

"I am particularly interested in the 'Improved Wormgut,' and am happy to say that IT WORKS, and in just the place that I desired most deeply to test it. A fractured olecranon secured with the new (to me) material gives perfect satisfaction; primary union and no fear of loose wires to make future trouble." —Dr. Howard Antcher, Roswell, New Mexico.

---

"One man's experience is often so fatally defective and misleading that I hesitate always to urge my own, but I certainly believe in, and employ, antiseptic ligatures rather than those merely aseptic. The iodine catgut is unfailing; I use it in all regions and for all sorts of tissue demanding a ligature or a suture. I believe that a faint tinge of antiseptic decides the issue in many cases. The iodine also hardens the catgut."—Dr. Howard Antcher, Roswell, New Mexico.

---

"Although slightly unusual in the doctor's office, where great quantities of all sorts of literature finds its way through the unusual, as well as the usual, channels, the impulse to acknowledge the artistic merits, general helpfulness and enterprising scope of your Red Cross Notes, No. 4, of the VII series, takes expression. Your editors, illustrators, printers, lithographers and others who contribute to this beautiful little book do credit not alone to the excellent traditions of the House of Johnson, but to the entire profession of medicine."—Dr. A. C. Steward, San Diego, Cal.

---

## CATGUT CONFIDENCE

In the old days of surgery, stitch infection used to be rather the rule than the exception, and the surgeon paid no attention to it. In these later days it is a reproach to a careful surgeon. There is absolutely no need for it. It is just as easy to use a sterile catgut as a septic one.

Johnson & Johnson's Red Cross Catgut is guaranteed to be absolutely sterile. You do not have to take their word for it. Take a piece of the catgut and put it into a test-tube containing nutrient bouillon, and if there is any growth of bacteria, Johnson & Johnson will eat

the greaser. Their ligatures simply can't be anything else than sterile. From slaughter house to package, the entire process of manufacture is conducted under bacteriological check tests. At the beginning of the process it is healthy, normal, animal tissue; at the end, it is unchanged in character, and aseptic. As a matter of fact, you don't need to test these ligatures in a tube; you can go to the clinical test right away, and play perfectly safe.—The American Journal of Clinical Medicine.

## A HIGH ENDORSEMENT

An inspection of the Ligature Department of Johnson & Johnson, New Brunswick, N. J., is a decided revelation.

Here you will find catgut prepared not from dry and brittle strands, as is so often the case with many manufacturers, but from intestines of freshly killed sheep which are carefully selected, cleansed of all fecal matter, blood, mucus and useless tissue at the point of shipment, and thus arrive at their laboratory in a perfect condition for twisting. This affords decided advantage over other producers, in that they can apply the chromic hardening solutions to the thin, loose tissue before twisting, instead of to the dry finished cord.

The laboratory in which Johnson & Johnson Catgut Ligatures are prepared is most ideal from every standpoint. The twisting, the packing and the final sterilization process is performed under the most complete sanitary surroundings possible, resulting in a finished product that is flexible and strong, that will tie down flat and not inclined to break at the knot; in fact, all in all, a catgut ligature that is worthy of and will command your full confidence.—**American Journal of Surgery, June, 1915.**

## HOME STERILIZED CATGUT

The superintendent of a hospital wrote to the editor of The Modern Hospital complaining that the doctors of that hospital were opposed to the use of catgut sterilized in the operating rooms and insisted that the hospital buy its catgut already sterilized. The superintendent declared that the hospital had never had an infection traceable to catgut, and asked the editor if he thought it necessary to comply with the doctors' demand. This is the reply the editor made:

> It is very doubtful whether your statement that you have not had infections is true; you probably think it is true; you must have had infections, else why would your surgeons insist on changing a practice that has proved to be satisfactory? Your doctors know better than you do whether you have had infections, and they are in position to determine better than you can determine whether your infections were probably due to catgut. You had better give them what they want and buy your catgut already sterilized. There are three or four firms whose chief stock in trade is their reputation and they certainly know more about catgut and its preparation than hospital people do, and they have always experts at their plants performing the work, whereas you entrust your work many times to young, inexperienced nurses, who rotate from one service to the other in the institution. There are too many chances for accident, and accidents due to infected catgut are too costly. Volumes have been written about the sterilization of catgut, and there are many technical points about it that have never been written at all. You had better do what your doctors want and avoid the responsibility.

—Sir James Crichton Brown predicts that in another forty or fifty years mortality from the now known preventable diseases will have disappeared.

—Red Cross Cotton is standard.

—Modern surgery deserves the best.

—J. & J. keep pace with science.

—Send for Physicians' List.

## FUMIGATORS TESTED

**T. Dudley Ballinger, Health Officer of Princeton, N. J., in Thorough Trial Finds Most Satisfactory Results.**

T. Dudley Ballinger, M.S., Health Officer of Princeton, N. J., has given Lister's Improved Fumigators a thorough test and has proven that the fumigators are effective and satisfactory for the practical uses of boards of health and physicians. His interesting report of his thorough trial is as follows:

"I have given the formaldehyde candles which you gave me a thorough trial and herewith present the results of my experiments. These candles were tested under conditions which resembled, as nearly as possible, those of routine usage by boards of health, in order that their value in actual practice could be determined. In all experiments the directions enclosed with the candles were closely followed. Check determinations were made at all stages to discover any possible error of technique.

"Experiment 1: Strips of sterile filter paper were dipped in a broth culture of B. typhi and dried in sterile petri dishes. These strips of filter paper were exposed in a room during the fumigation. The room selected was an ordinary bedroom of average tightness with an air capacity of 1,000 cubic feet. During the experiments all openings were carefully sealed in the same manner as commonly employed by fumigators. Two candles were used in this room which was sealed for four hours. After exposure during fumigation the filter paper was inoculated into tubes of sterile broth. The following are the results:

Strip (a) Exposed on floor. No growth in broth.
Strip (b) Exposed on floor. No growth in broth.
Strip (c) Exposed on top of cabinet. No growth in broth.
Strip (d) Exposed on shelf of closet. No growth in broth.

"That the organisms were not killed during the period of drying was shown by two check determinations.

"The results obtained show that B. typhi were killed by the process of fumigation.

"Experiment 2: To confirm the above results, the experiment was repeated under identical conditions.

Strip (a) Exposed on floor. No growth in broth.
Strip (b) Exposed on floor. No growth in broth.
Strip (c) Exposed on top of cabinet. No growth in broth.
Strip (d) Exposed on shelf of closet. No growth in broth.

"Check determinations were also made to eliminate any error arising from the death of the organisms during the drying process.

"The results confirmed those of Experiment 1 and showed that the fumigation killed the cultures of B. typhi."

## WAR AND THE POPULATION

Professor Schwiening, surgical historian, reporter of the War Office, and associate editor of the Deutsche Medizinische Wochenschrift, recently spoke of the influence of the war on the movement of population. The influence which the direct losses—that is, the deaths as a result of wounds or sickness—have exercised in recent times on the number of the population is relatively small. Even in the war of 1870-1871 the losses amounted to only one per cent. of the entire population of Germany.

As opposed to the direct losses, the indirect loss of population is essentially larger, since wars exercise an especial influence on those factors which are fundamental for the further development of a people, particularly on marriages and births on the one hand, and on the general mortality on the other. Every great war reduces at first the number of mar-

riages to a considerable degree. The diminution in the years of war, however, is followed in later years by so much more marked increase of marriages that the loss is again compensated. Still greater is the diminution of births as a result of the war which cannot be fully explained by the diminution of marriages and the absence of many men, but is also to be referred to physchologic hindrances among those who remain behind. Here also there follows in the years after the war a considerable increase, so that the loss is quickly replaced.

Finally, the entire mortality in many wars is markedly increased by the fact that on account of them, great epidemics occur in the civil population and demand many victims. In many wars of previous centuries, these losses through epidemics have actually been much greater than the essential losses from the war, and have led to the complete depopulation of many cities. A peculiar phenomenon is the increase of emigration which almost always makes itself evident after great wars, and may have its basis in the political and economic and personal changes which every war involves.

What influence the present war will exercise on the population and on the movement of population of the German Empire cannot yet be predicted. It may be assumed with certainty that the unfortunately marked reduction in the birth rate, which began in Germany about ten years ago and could not be arrested by any of the numerous measures directed against it, will be checked so that after the war another marked increase of births will set in. If that is the case, the war, in spite of the great sacrifice of human life, will be a blessing for the development of our entire population.

## GAUZE PAD: NEW PRODUCT

Physicians for some time have felt the need of a small pad of gauze for wound dressing and innumerable other purposes. Johnson & Johnson are now prepared to fill this want. In their Red Cross Cotton Mills a surgical gauze of thin, open-mesh cloth, resembling cheesecloth or mosquito netting, has been carefully prepared. It is especially made for the dressing of wounds and is not to be confused with gauze which can be purchased in the drygoods and general stores.

Surgeons everywhere have found this gauze a sick room necessity. Now Johnson's Aseptic Gauze Pads have been added to the list of products of the House of Johnson, and they are of the same high-grade standard.

Each pad is nine inches wide and thirty-six inches long, packed in sealed envelope. Five yards of gauze so packed in envelopes is placed in a pasteboard container.

## HARDENED CATGUT

**It Is Important that the Surgeon Understand the Degrees of Hardness of Catgut He Is Using.**

The object of treating catgut with chromic solutions is to harden it to such an extent that when it is used as a ligature its absorption is retarded to a certain degree. Until chromic catgut came into use surgeons depended upon excessively large strands when they desired to delay absorption. This, of course, necessitated the use of larger knots and frequently caused infection, or there was too rapid absorption of the gut even with such large strands. With the chromicizing of catgut surgeons were able to use smaller sizes than before, with greatly reduced knots, less material buried and less danger of irritation or of the formation of a pocket or sinus.

Care must be taken not to use too large strands of chromic gut, for the result will be that long after the wound is healed the knot will still remain unabsorbed and will set up an irritation. Small strands are recommended, doubled if greater tension is desired, as two fine strands will be absorbed much more quickly and easily than one large one, and at the same time the knots are much less liable to cause trouble. If a surgeon selects the right size, but neglects to take into account its degree of hardness and uses the extra-hard chromic instead of the medium-hard for certain tissue, his results may prove equally unsatisfactory.

It is important that the surgeon understand the degrees of hardness of the catgut he is using. With catgut of three kinds—plain, medium-hard chromic and extra-hard chromic—the surgeon has every chance to select the right gut for the work he expects to do according to his knowledge of the time necessary for it to remain in the tissue.

The following gives a rough idea of the use of the different kinds of catgut in various tissues, but it must be remembered that all patients are not average and that age, vitality, etc., must govern individual cases:

In muscle—No. 1 medium-hard chromic.

In fascia—No. 0 or No. 1 medium-hard chromic.

In skin—No. 0 medium-hard chromic.

In peritoneum alone—No. 0 or No. 1 medium-hard chromic.

In peritoneum through and through—No. 2 or No. 3 extra-hard chromic.

In cervix—No. 2 extra-hard chromic.

In vagina—No. 2 extra-hard chromic.

In rectum—No. 2 extra-hard chromic.

In kidney or bladder—No. 1 or No. 2 extra-hard chromic.

In stomach or intestines—No. 1 or No. 2 extra-hard chromic.

It is important that chromic catgut should be evenly hardened throughout its entire structure, and it is for this reason that Johnson & Johnson chromicize the intestinal tissue in the soft, loose condition before it is twisted to make the cord. This treatment insures an even treatment of the strands throughout, the exceeding thinness of the tissue making immediate penetration possible. This is exclusively a Johnson & Johnson process.

The surgeon who once becomes accustomed to the use of Johnson & Johnson catgut has no trouble in choosing the proper size, because he knows what to expect of it in the average patient.

---

—Doctors are studying men more and medicine less.

---

—The object and aim of the physician is to obviate the tendency to death.

# A Full Pound of Cotton Protected from Infection

RED CROSS COTTON is made of carefully selected fibre in a surgical dressing laboratory. Throughout the various stages of manufacture it is protected from infection and upon final packing it is sterilized. Perfect absorbency and absolute sterility are guaranteed.

Red Cross Cotton is the only absorbent cotton that is wrapped in such a way that all surfaces, including the edges, are fully protected from dust, dirt and infection, whether in or out of the

carton. This enables the user to cut as much from the roll as is desired without touching the remainder, insuring a perfect aseptic condition of the roll until the last particle is used.

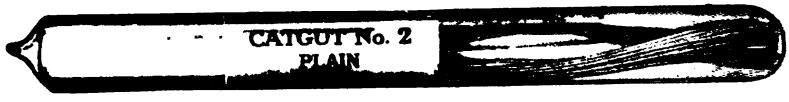
In a pound package of Red Cross Cotton there is a pound of absolutely perfect cotton fibre, exclusive of the weight of tissue or other wrappings. Every other size package, even to the smallest ounce or half ounce, contains the full net weight.

Red Cross Cotton is to-day the standard for the world's production—a standard which is imitated and striven after, but which stands in a class by itself.

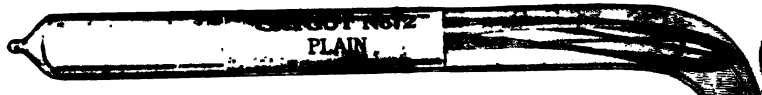
In ordering, specify Red Cross Cotton.

# Ligatures with the Mark of Confidence

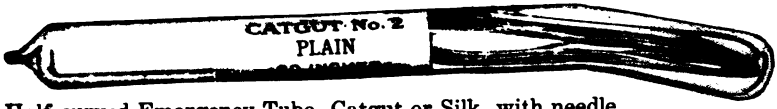
Standard Tube Chromic Catgut in amber glass



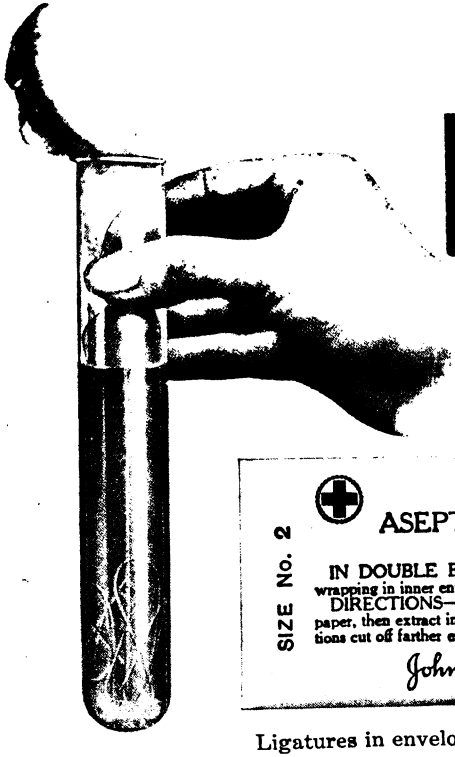

Standard Tube for Catgut or Silk




Full-curved Emergency Tube, Catgut or Silk, with needle




Half-curved Emergency Tube, Catgut or Silk, with needle



BACTERIOLOGICAL TEST No. 2

Samples from this lot of ligatures have been
in our Bacteriological Laboratories and found ste

Johnson & Johnson

This guarantee, showing result of labo
test and serial number of lot, appe
every package of one dozen ligatures

Catgut under bacteriological control. A
test-tube of sterile broth containing
strand of catgut taken from a tube. If
sterile a visible growth appears in the broth

SIZE No. 2

RED CROSS

ASEPTIC CATGUT LIGATURES

No. 2, LENGTH, 28 INCHES

IN DOUBLE ENVELOPE, GERM PROOF. These Ligatures
wrapping in inner envelopes have been made aseptic by successive sterilizations
DIRECTIONS—(1) Remove the outer envelope. (2) Tear off end of
paper, then extract inner paper, touching only the end. (3) Under aseptic con
tions cut off farther end of inner paper and draw out ligature.

Johnson & Johnson NEW BRUNSWICK, N. J. U.

Ligatures in envelopes: Catgut, Silk, Horse-Hair and Tendon

eries VII

656

Number Six

BOSTON MEDICAL
JUN 1 1916

# RED CROSS NOTES

PUBLISHED BY Johnson & Johnson NEW BRUNSWICK, N. J., U.S.A.

THE SCIENTIFIC DEPARTMENT of the House of Johnson stands as a sentinel challenging every material which seeks admission to the laboratories and protecting the public from inferior products. Here is pictured a corner in its laboratories. To the left is the bacteriological apparatus and to the right an equipment for chemical operations.

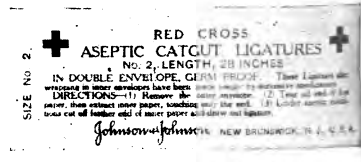
# Detailed Immensity

WHEN surgeons visit the Johnson & Johnson laboratories they are impressed first with the immensity of the industry and then with the attention that is paid to details. They marvel that where such a bulk of products are manufactured that so much individual attention is paid to each article sent from the laboratories. One visitor said:

**Sterile Ligatures in Glass Tubes**

"I do not wonder that Johnson & Johnson are the largest producers of catgut ligatures in the world. They have been successful because they have gone into the production of these surgical necessities more thoroughly than any other concern.

"No one else thinks it worth while bothering with the process of preparation from the living animal to the finished strand of ligature, but I noticed that no detail is so slight that it can be neglected in the Johnson & Johnson laboratories."




**Sterile Ligatures in Envelopes**

Johnson & Johnson's aim has been to produce the ideal catgut ligature and they offer surgeons a perfect cord, made of healthy, normal animal tissue, sterilized, aseptic and unchanged in character, absorbable without reaction or disturbance of the wound-healing process. The surgeon can use it with complete confidence.

JOHNSON & JOHNSON
New Brunswick, N. J.

Write for samples and
"Handbook of Ligatures"

# RED CROSS NOTES

COPYRIGHT 1916 BY JOHNSON & JOHNSON

SERIES VII NEW BRUNSWICK, N. J. NUMBER SIX

RED CROSS NOTES
Published by JOHNSON & JOHNSON, New Brunswick, N. J., U. S. A.
Fred B. Kilmer, Editor

This publication is issued from the laboratories of the publishers with the intent to give, in brief, items of interest and reports of original research along the line of the particular branches of the art in which they labor.

Persons receiving *Red Cross Notes* will confer a favor by notifying the publishers of any inaccuracy in the address on the wrapper and of any change of their address.

## The Scientific Department

Considerable of the space in this issue of the Red Cross Notes is given over to the work of the Scientific Department of Johnson & Johnson. We do not refer to this work boastfully, but merely for the information of the profession.

There are times, says Balzac, when selfishness is a sublime virtue, but we lay no claim to possessing such virtue. The Scientific Department is not conducted in any narrow commercial spirit, but the constant desire has been, and will continue to be, that the department render the greatest service to the profession of medicine and surgery and thus contribute to the good of all mankind. It is not maintained for the purpose of paying dividends or solely for the benefit of Johnson & Johnson, but as a service to humanity. Its chief concern is the progress of the art of healing.

The department is always pleased to place its facilities at the disposal of the practitioners of medicine and surgery for any work within its domain. The members of the profession in general are invited to take advantage of the facilities offered either in the working out of the new problems or the study of the old ones.

As the years have been tolled off and the Johnson & Johnson laboratories have been multiplied, the Scientific Department has kept ever in advance of the development of the manufacturing departments, ever protecting Johnson & Johnson from inferior raw materials and the medical profession from inferior finuished products.

To the watchfulness and the resourcefulness of this department must be given much of the credit for the unshaken confidence of the profession in the name of Johnson & Johnson and the Red Cross label during the nearly thirty years' existence of this company.

## TESTING RAW MATERIALS

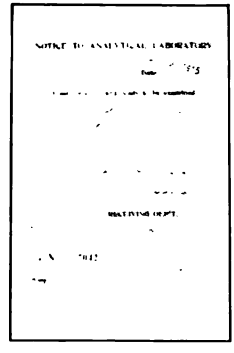
**Johnson & Johnson's Scientific Department Stands Guard Over the Receiving Warehouses As Well As Over the Manufacturing Departments.**

When a barrel of capsicum or a drum of glycerin arrives at the Johnson & Johnson warehouses they are not at once delivered to the department which ordered the material. Nothing passes from those warehouses to the manufacturing plant until the analytical department of the Johnson & Johnson laboratory places its stamp of approval upon the material. And before that is done the goods must be tested.

A corner in the Analytical Department

Upon receipt of raw materials the warehouse department places a tag upon each package, those in the same shipment receiving the same lot-number. The receipt of the goods is communicated to the chemical laboratory upon a printed blank form in duplicate. Samples from the containers themselves are then secured personally by one of the laboratory force. These samples are examined in the laboratory according to regular methods.

For instance, upon receipt of capsicum (powdered), which is imported from Zanzibar "Chillies" and ground to order, the chemist conducts the following examination.



Notice of receipt of goods to be examined

1. Observation of appearance and odor.
2. Micro-examination with iodine solution, for starch.
3. Percentage of moisture present.
4. Percentage of oleoresin extracted with ether. Should be over fifteen per cent. This is the requirement of the U. S. Customs.

If the sample passes the test, and the chemist is satisfied that the material measures up to the high standard demanded by Johnson & Johnson, the re-

Tags applied to packages after examination

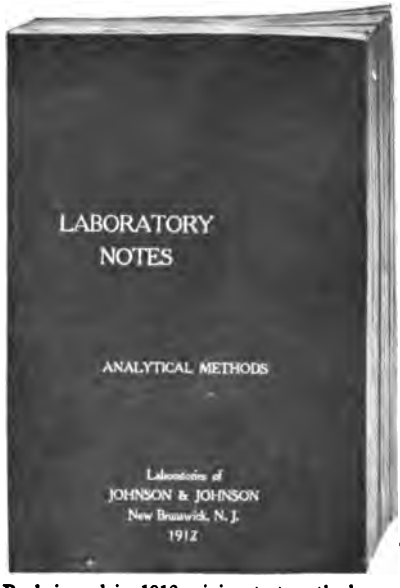
port blank is filled out and the container of the materials is marked with an acceptance tag containing the date, contents and test number. The responsibility for the acceptance or the rejection of any goods is placed squarely upon the chemical laboratory. The materials which fail to receive the acceptance tag are never transferred to the manufacturing buildings.

The process is the same with all materials, the manner of the test being different, of course. The analytical tests,

View of Analytical Laboratory, showing gas table, autoclav, incubators, etc.

to which nearly two hundred important materials of a chemical character are subjected, are explained at length in "Laboratory Notes," one of the Johnson & Johnson publications, and physicians will find this book of value in studying the nature of the tests.

The purpose of the examinations is to assure the manufacturing departments as to the quality of the material supplied to them for the various articles which they produce, and to protect the purchasing department from the receipt of impure and incorrect supplies. With many of the tests there can be no possible reference to the United States Pharmacopeia, as a standard for their requirements, so that it has become necessary in many instances to establish




**Book issued in 1912, giving test methods used in J & J laboratories**

a standard which will, in subsequent application, control the goods, and to gather through this record of experiments a knowledge of what variations from such a standard can be allowed. Many of the tests elaborated by this department have been accepted as authoritative.

These tests are only one phase of the work of the scientific department. In addition to the examination of the raw material, the work of the department lies along many lines of chemistry, pharmacology, bacteriology and allied sciences. The processes employed in the factory are checked and tested in all the various stages up to the finished material. Special attention is paid to surgical material, such as absorbent dressings and ligatures, a series of check tests being made for the purpose of record and to establish the accuracy and value of the processes. In addition,

studies are made into the manufacture. This is done with the view of, wherever possible, eliminating any imperfection, weakness, or inaccuracy and with a further view of the improvement of the process or products.

The laboratory workers have been aided from time to time by specialists in surgery, medicine and hygiene, who have supplemented the work of the laboratory by clinical experiments and practical application. The workers keep in touch with every stage of progress in the science of medicine, surgery and sanitation, whether the subject may be closely or remotely connected with the industry.

The work of the Scientific Department on belladonna may be cited as an example of the studies made of drugs. Belladonna has been studied from pharmacognostic, physiological and therapeutic points of view. Every gleaner in materia medica, in either the Old or the New World, who has ever made an observation upon this drug, has been under review. Researches, extending through many months into years, have been devoted to this one drug. New and important observations in respect to belladonna have been reached and recorded. Not only has the world's market supply of belladonna been under searching investigation, but a series of observations as to belladonna cultivated for the first time upon American soil has been the subject of most elaborate study. As a result the belladonna preparations of today have an enhanced value.

The study of antiseptics and disinfectants, their action upon bacteria and their practical application resulted in the publication of a series of health bulletins, designed to give practical application of the latest and best principles of modern hygiene.

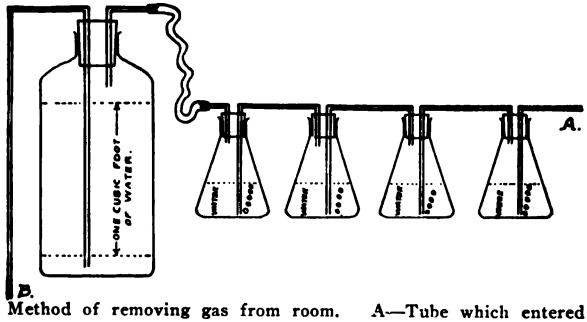
## FORMALDEHYD TESTS

**Johnson & Johnson Carry Out Experiments with Formaldehyd Disinfection, Resulting in Production of Lister's Improved Fumigators.**

From time to time there has been a considerable amount of discussion among Board of Health officials as to the usefulness of formaldehyd disinfection of rooms and dwellings in which there has occurred a case of infectious disease. The subject of discussion has not been the actual germ-killing power of formaldehyd gas, for that has often been worked out by the bacteriologists, but more especially the question of actual efficiency under average working conditions as present in the ordinary dwelling house.

One of the questions that has been given considerable prominence is that of the possibility of condensation of the formaldehyd on the walls of the room with a resulting decrease in strength of the amount of gas in the central parts of the room—in other words, uneven distribution.

In order to secure some data on this subject, the Johnson & Johnson experimental laboratory has carried out a series of experiments with formaldehyd by evaporating in a room of known size a definite quantity of paraformaldehyd of assayed strength and then withdrawing from that room a definite proportion of its contained air, drawing this air through flasks containing water so that the formaldehyd gas in the air was absorbed by the water. Afterwards the amount of formaldehyd dissolved in the water was determined by chemical analysis, and from these figures calculation made to ascertain the total quantity present in the air of the room, on that basis.




Method of removing gas from room. A—Tube which entered the room. B—Syphon tube to take water out of large bottle.

In order to place this series of tests on a true scientific basis it was believed to be necessary to use a room that was practically air-tight, so as to avoid leakage of the gases. Therefore, we had built a room or box of galvanized sheet-iron, made just a trifle less than eight feet in each dimension, that is to say, an eight-foot cube; a room eight feet long, eight feet wide and eight feet high. Such a room has a capacity of five hundred cubic feet.

All of the joints and seams were soldered tight and the only chances for leakage were a small door at the lower part for entrance and a trap door or lid in the top for allowing the fumes to escape after a test. These were both made practically tight. The room was built in a large store-house in the Johnson & Johnson plant, the same being maintained at ordinary living-room temperature.

The requirement of Boards of Health is that one grain of paraformaldehyd shall be used for each cubic foot of space to be fumigated. This, therefore, would require the use of 500 grains paraformaldehyd.

To accomplish the evaporation of the paraformaldehyd in a convenient manner, an electric wire was run into the room and connected thereto was an electric hot-plate. On this was placed 500 grains of paraformaldehyd and when all openings were closed, the current was turned on from outside the room and the operation observed through a pane of glass in the wall of the room. As will be seen by examination of the reports given below, complete evaporation of the paraformaldehyd was accomplished in a short time. The removal of one cubic foot of gas from the room had to be done slowly and carefully in order to insure complete solution of the gas in the four portions of water. This was done by regulating the flow by a cock so that the air bubbled up at a regular rate through the water in the flasks.

Referring to the diagram, the tube A is run through a cork in the wall of the room and is of sufficient length to reach to the center of the room. Now upon opening a cock in the tube B, the water in the large bottle is syphoned out and in so doing produces suction which in turn draws the air from the small flasks containing the absorption water. The air from the center of the room is thus gradually drawn through tube A, through all of the four flasks, bubbling through the water in each and is thus

washed four times, which we found to be necessary in order to absorb from the air all formaldehyd vapor mixed with it. The diagram shows the bubbles passing through the absorbing water.

The size of the large bottle is such that one cubic foot of water is contained between the marks so that if the operation is started with the water at the upper mark and continued until its level reaches the lower mark, just one cubic foot of water has run out and, of course,

A compact and efficient formaldehyd disinfecting device

its place has been taken by air drawn by it from the room and from which all formaldehyd gas has been dissolved by the water in the four flasks. It is, of course, essential that there shall be no leaks in any of the connections. It is to be clearly understood that the only purpose of the large bottle is to withdraw a measured portion of air.

Tests A and B give records and results of the tests. These experiments, we believe, show conclusively that the air in the center of the room contained the full quantity of formaldehyd gas that by calculation should be secured from the weight of paraform used. There was no condensation and there was even distribution.

RECORD OF TESTS

| | Test A | Test B |
|---|---|---|
| Amount paraformaldehyd used, | 500 grains | 500 grains |
| Analysis of paraformaldehyd used, | 96% | 96% |
| Amount pure paraformaldehyd used, | 480 grains | 480 grains |
| Temperature of room, | 75° F. | 72° F. |
| Time to evaporate, | 20 minutes | 20 minutes |
| Time to draw 1 cu. ft. of air, | 1 hour | 1 hour |
| Grams formaldehyd from 1 cu. ft. air, | .06136 | .06136 |
| Grains formaldehyd from 1 cu. ft. air, | .945 | .945 |
| Grains formaldehyd in 500 cu. ft. air, | 472.5 | 472.5 |
| Proportion recovered, | 98% | 98% |

NOTE.—That the figures in these two tests are exactly alike is merely a coincidence, as the tests were made on different days.

The results indicate clearly that by vaporizing paraform in a room there is secured an entirely satisfactory amount of formaldehyd gas.

On the strength of these very satisfactory tests, Johnson & Johnson set out to design and produce on a large scale a small, compact and efficient formaldehyd disinfecting device using the exact methods of this test, viz: The vaporizing by heat of a definite quantity of paraformaldehyd. Five hundred grains was decided upon as a convenient and acceptable quantity for each little fumigator. Under the tin container is placed a wax candle of special design and it contains sufficient wax to cause the evaporation of all of the paraform in the tin flask over it.

The tests herein given were not designed to determine the germ-killing power of formaldehyd since that is well known from the results of tests by many other experimenters. As to that matter we especially here call attention to the well known but often disregarded points, that formaldehyd gas is much more active in destroying germ-life when there is present a considerable amount of moisture in the air and when the room is warm. We strongly urge attention to these facts and request users of Listers Improved Fumigators to observe the following rules:

1. Use one disinfector for every 500 cubic feet of space in the room.
2. Close tightly all windows, doors or other openings.
3. Hang up in the room one wet sheet for every 500 cubic feet of space in the room, or thoroughly impregnate the atmosphere of the room with steam from a kettle of boiling water, immediately light the candle in the disinfector and leave the room.
4. Have the room warm, 70 deg. F., if possible.
5. Open all drawers, etc., and have all bedding, blankets, towels, etc., opened out and hanging loosely over chairs, etc., so as to expose all possible surfaces to the gas, which has but little penetrating power.

---

## DOCTORS NEED THIS CATALOG

Johnson & Johnson are not only manufacturers, but scientific investigators who have contributed very largely to the advancement of the medical and surgical profession. In their research department there is at all times a competent force who dedicate all their time and labor to experimental investigation in chemistry, surgery, bacteriology and allied sciences. It is an admitted fact that Johnson & Johnson have given surgery, medicine and pharmacy very valuable service and that the material emanating from this house has aided the medical and surgical profession, throughout the world, to apply the best methods of advanced science.

This service has resulted in a close relationship between the medical profession and Johnson & Johnson. In order that every physician may be fully acquainted with the principal products manufactured by Johnson & Johnson a

Contains terse descriptions and accurate illustrations of principal J & J products

new edition of the "Physicians' Descriptive Catalog" has been published. It is a book of over one hundred pages, illustrating and briefly describing the products of the largest manufacturers in the world of medical plasters, absorbent cotton, bandages and surgical supplies. A copy should be in the hands of every physician in the land. A request to Johnson & Johnson will deliver a copy at any physician's office by return mail.

---

—Cotton is king in commerce. Absorbent Cotton rules the Empire of Surgery.

## SELECTION OF RAW COTTON

**Every Bale of Cotton Arriving At the Red Cross Mills Is Tested by Experts Before It Is Admitted.**

The production of an absorbent cotton of the quality of Johnson & Johnson's Red Cross brand, which has won and retained the confidence of the physicians and surgeons of the whole world, necessitates the most careful handling

Expert cotton examiner at work. Each cylinder contains a sample taken from a separate bale and is tagged with the bale marks.

of the raw cotton fibre. Where great quantities of cotton are handled annually, as at the Red Cross mills, where immense amounts of it are arriving almost continually, one might think that there would be some carelessness in handling it in its rough state; that the operators would follow the line of least resistance, feeling sure that any imperfections would be detected later on under the constant system of supervision and inspection. But carelessness is unknown in the Red Cross mills. Every operator is keyed up to the efficiency point and in handling cotton the inspection starts the minute the baled cotton knocks for admission to the mills.

The precautionary methods really begin before the cotton arrives, as Johnson & Johnson select their cotton in the cotton-growing regions and demand a specified standard.

As the cotton arrives at the warehouse every bale is weighed and numbered and marked for identification and a sample of cotton taken from it, which is likewise marked for identification. These samples are placed in individual paper cylinders and are examined by experts as to cleanliness, length of fibre, strength of fibre, amount of ripe and unripe fibre, color, etc. These experts must first be assured that the samples are free from broken leaves, the result of careless picking; from mud, sand and mineral matter, sometimes added as an adulterant, and are clean. Next they look for short fibre cotton, which is sometimes mixed with the long fibre; for unripe and immature fibre, which is unfit for use in absorbent cotton or to be spun into gauze; for broken or ruptured fibre, traceable to the action of the ginning machine; for the stringy or tangled cotton.

Next, the color of the sample is taken into consideration, it being examined to see if it is stained or tinged with the stains of the plant or is naturally off color to such an extent that it will never become white. Then an examination is made to determine if the bales run fairly even in all points.

If a sample passes this searching test satisfactorily it is tagged "accepted," but if it flunks it is unhesitatingly tagged "rejected," and never finds its way into the mill.

All grading of cotton is governed by the United States Department of Agriculture samples. This national depart-

ment will furnish a set of the different grades of cotton to any one interested, and Johnson & Johnson have such a set of samples and require that the cotton which goes into their mill shall come up to the standard of the Department of Agriculture.

When cotton is to be prepared for wound dressing, the utmost care must be taken in handling the delicate fibre. Johnson & Johnson not only realize this, but have not hesitated to so surround the whole preparation of their products that cotton is guarded and protected from the minute it arrives in bale form until the time it leaves the shipping room sterilized and ready for use.

## EDUCATE THE PUBLIC

Physicians and Health Boards have found the series of Contagious Disease Bulletins published by Johnson & Johnson a valuable aid to them in times of epidemics in their communities and also as a means of conducting a campaign of education. The Consumption Bulletin, illustrated, containing sixteen pages, has had a very wide circulation and has performed an important work in arousing the nation to arms in the battle against the White Plague. There are also pamphlets covering diphtheria, typhoid fever, meningitis, scarlet fever, measles, whooping cough and smallpox. They are all written from the standpoint of the best authorities upon sanitation and embrace the latest and best known methods used by Health Boards to combat contagious and infectious diseases.

We have gathered a set of these bulletins together and enclosed them in a cover, and will be glad to send the collection to any physician, nurse, health officer or other interested person. Just ask for Contagious Disease Bulletins. Health officers, societies and others who

Copies of these bulletins sent on request

may desire to secure quantities of specific bulletins for circulation are invited to correspond with Johnson & Johnson, stating the number that can be used to advantage. The directions given in the bulletins are plain and simple and are especially adapted to educational work among the masses.

## A BOOK WITH A MISSION

This is the title of a forty-page book issued by Johnson & Johnson. "Its mission," as explained in the introduction, "is to show that contagious and infectious diseases may be controlled, prevented, and ultimately eradicated by systematic measures." Thus it is working as an aid to the medical profession who are earnestly teaching their patients and the public the same thing. Care has been taken to avoid technical terms, to suggest simple yet effective methods for isolation and disinfection. They can be carried out under all conditions and circumstances, the methods in many instances having been contributed and sanctioned by the highest authorities on sanitation.

Copies of this book will be furnished free to physicians, health officers, nurses and others upon application.

## ANTISEPTICS IN WAR

Dr. Alexis Carrel, who is working in a temporary hospital and laboratory on the edge of the Forest of Compiegne, six and one-half miles from the front, and where it is said the roar of artillery is distinctly audible, has several times emphatically stated that we must use antiseptics. By antiseptic treatment alone can wound infection be checked.

Aseptic surgery is all very well in time of peace, when wounds are not infected, but in war all wounds are more or less infected, and it is this infection rather than the laceration of bone and tissue that is responsible for the mortality or the need of radical surgical intervention.

According to Dr. Carrel's description, the history of a wounded man is briefly as follows: He is hit by a bullet or a fragment of shell. Mud, bits of clothing, etc., are forced into the wound, accompanied by steel splinters or bullets. He may or may not receive first aid treatment, and then be passed on to an ambulance, thence to a clearing hospital, and after a long delay is sent to the rear by train. He reaches his ultimate destination thirty-six, or even forty-eight hours, or more, after the injury occurred. Such a case has been more or less roughly handled and precious time has been wasted, as it is during this period that infection, whether it be gaseous, gangrene or other complications, becomes manifest.

Dr. Carrel states that painting the wound with iodine is of little value, except to clean the skin, as it fails to check infection. The main object is to get the man in a clear atmosphere, clean the wound and treat it antiseptically, in order to kill all infection. This alone can prevent further disastrous complications. Once a wound is in a healthy state and all danger of further infection past, a man can easily be sent to the rear without risk.

Dr. Carrel and his assistants are now using a compound of chlorine and boracic acid.

Dr. Carrel has also stated that he has found that small and seemingly insignificant wounds must be treated with as much care and speed as more important lesions. Red tape efficiency of organization, in his judgment, is detrimental to the individual in the present "Sanitary Service."

Methods of treating wounds in use at the outbreak of the war, and in many cases still continued, have patently failed. The use of antiseptics inaugurated by Lister, and to-day championed by so eminent a surgeon as Dr. Carrel, is worthy of consideration. In the present war it has been found that wound infection and not bullets is the deadly scourge.

---

## TERMINAL DISINFECTION

For a considerable period terminal disinfection, by the aid of disinfectants and fumigation by formaldehyd, has been recognized as a desirable routine after the more common infectious diseases, such as diphtheria, scarlet fever and tuberculosis. Recently there has been a tendency in some quarters to abandon terminal disinfection. Some of the advocates of this abandonment urge that drying, exposure to sunlight and other agencies have a tendency to bring about the destruction of infection by processes of nature. The wisdom of the abandonment of terminal disinfection has been seriously combated.

At the last annual convention of the State and Provincial Boards of Health, N. A. Hasseltine seriously questioned the wisdom of the abandonment of terminal disinfection after infectious disease.

The advocates of the abandonment of

this practice have always fortified themselves by agreeing that when unusual circumstances arise every possible opportunity of destroying even a small amount of infection should be emphasized.

The Journal of the American Medical Association suggests that even if it is true that the results are quite as good without disinfection as under the older system, it may be well asked—is it because the latter effort was useless or because it was not properly carried out? The conduct of such an operation as terminal disinfection is not a tyro's job. Even where terminal disinfection is abandoned there must be enforced a more rigid care surrounding the focus of infection.

Mr. M. J. Rosemau, the well known authority, stated that "if terminal disinfection prevented the occurrence of only a small number of cases, it would still seem to be worth while."

The Journal of the American Medical Association tersely stated that "the discontinuance of any method of disinfection on the ground that it is useless should be based on substantial evidence."

## DOCTORS AND FIRST AID

The First-aid-to-the-injured movement has spread to every part of the country. Boy Scouts, military schools, summer schools and many public schools are now teaching the young the first principles of self-preservation and the art of giving first aid to those in distress. Physicians and surgeons are being asked to take leadership in the movements in many towns and are complying with the requests. They unhesitatingly give their services to spread a knowledge of what should be done, in case of an accident, before the physician arrives on the scene.

Factory, mine and railroad doctors find that they must instruct men in first aid treatment. They get inquiries continually for information about first aid work and first aid equipments. Johnson & Johnson have published an illustrated catalog on First-aid-to-the-injured, which answers all of these questions for the physician. It describes the First Aid Outfits which Johnson & Johnson supply in great numbers to factories, mines, railways, schools, institutions, etc., and gives the uses of the various materials in the outfits and a list of all available supplies and literature for instructors and students.

This catalog will be sent free to any doctor or first aid instructor who will write for it. Just ask for First Aid Catalog No. 110, Address: First Aid Department, Johnson & Johnson, New Brunswick, N. J.

## BLISTERING TIME TABLE

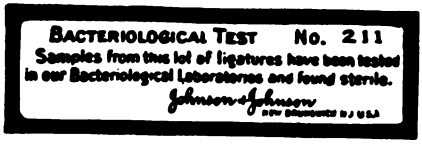
The Scientific Department of Johnson & Johnson has published a twenty-four-page booklet covering, in an interesting and informing manner, the subject of blistering. In concise form are the facts that the busy physician wants to know. There are chapters on Hints on Blistering, Two Ways of Dressing Blisters, Cautions About Blistering, Strangury, Flying Blisters, from the suggestions of Dr. S. Solis Cohen and other authorities.

A copy of "Blistering Time Table" will be sent free to any physician on request. Address: Johnson & Johnson, New Brunswick, N. J.

—Papoid will readily digest away all dead septic and extraneous matter.

—Red Cross Absorbent Cotton is sterilized in its last and finishing process. Every ounce and every pound that leaves the factory is aseptic.

# Bacteriological and Other Tests Applied to


BACTERIOLOGICAL TEST No. 211
Samples from this lot of ligatures have been tested in our Bacteriological Laboratories and found sterile.
Johnson & Johnson

The above label must be placed upon every batch of ligatures by the Johnson & Johnson Bacteriological Laboratories before the packages of finished ligatures are permitted to leave the manufacturing laboratories for distribution to the trade. Although prepared under perfectly aseptic conditions from selected and thoroughly cleansed and sterilized intestines of sheep, they must stand a final and exacting check-test before they are placed in the surgeon's hands to be used in delicate operations. This test is substantially as follows:

From each batch of ligatures, as finished, a certain number of samples are taken. Under precautions and aseptic conditions each sample package is opened and the ligature strand is removed from its container with sterile forceps and dropped into a tube of prepared sterile nutrient broth. This is subjected to the temperature of the culture chamber for a sufficient time, and if no growth has taken place it is considered conclusive proof that the whole of the batch is sterile, and the packages are marked with a label similar to that shown at the top of this column.

These tests are supplemented from time to time by a microscopical examination, by a process of infecting the ligature material with the test organisms and passing the infected ligature through the sterilization processes. If no growth has taken place in the portion of infected material that has passed through the sterilization process, it is certain proof that sterilization has been complete in all of the ligatures.

Guinea pigs use

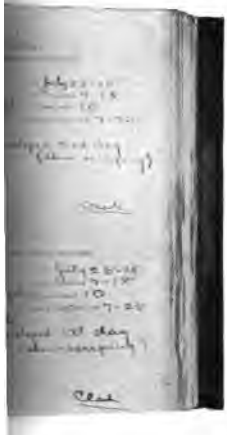
Tube containing nutrient broth, into which a strand of catgut has been placed for testing.

Sample p

The gauge upon

# tures at the Johnson & Johnson Laboratories

absorption of catgut



teriological test record

Apparatus for testing strength of catgut

gut is tested for size

The bacteriological check-tests of our ligatures run into many thousands. A sample page of the records is shown on this page. These bacteriological tests are the most perfect means to check the efficiency of the sterilization process that could be devised, and each one is a guarantee of perfection of the sterilization.

In the past there has been considerable confusion in respect to the sizes of ligatures, more especially in regard to catgut. In order to bring about a uniformity of measurement, Johnson & Johnson introduced a rational scale for catgut measurement and adopted a specially devised steel gauge for gauging the size. Their scale was based upon thousandths of an inch, each size being three-thousandths of an inch increase over the next smaller one. In constructing this scale the numbers so long in use were retained, and so far as possible no apparent change was made in the sizes of the catgut. Each piece of catgut is measured three times by different people while being sized.

There is no guesswork about determining the tensile strength of ligatures at the Johnson & Johnson laboratories. Testing machines are used to determine the tensile strength, they registering the number of pounds necessary to break catgut or silk. Strands from every coil are carefully tested for tensile strength and no catgut is used which does not stand the required number of pounds.

## THE CARE OF THE TEETH

### A Few Suggestions As to One Way to Accomplish Absolute Cleanliness or Asepsis Within the Mouth and to Maintain a Healthy Condition.

(Contributed by the Dental Department of Johnson & Johnson)

Probably there is no subject of equal importance that receives as little serious thought from the average person as the proper care of the teeth. It is a subject upon which there has been a vast amount of study and a vast amount of knowledge gained in the past few years.

Inspection of the mouths of children in the public schools and in various institutions in the larger cities of the United States, in which public dental clinics have been established, has afforded an opportunity for study of the effects of proper care of the mouth upon the general health and mental faculties; and a great amount of data and valuable statistics has been compiled. The evidence is indisputable.

A clean mouth and teeth in good condition for thorough mastication are of the greatest importance in maintaining general health and in assisting the body to resist disease. The direct benefits that are shown physically and mentally are far beyond anything that has been realized up to this time.

Take, for example, a far-from-unusual case, a mouth that is uncared for and in which accumulated particles of food in a state of decomposition are always present, a number of the teeth are decayed and all are loaded with tartar and soft excremental matter, the gums are inflamed, spongy and frequently bleeding if touched. In the more advanced diseased conditions there may be an exudation of pus from around the necks of some of the teeth, or there may be abscessed teeth from which pus may drain through a fistulous opening in the gum. All of this describes a condition not uncommon, but one that may be met with in a greater or lesser degree on all sides.

This mouth is a source of continuous poison to the entire system, that may show its effects in various disorders or diseased conditions anywhere from the crown of the head to the soles of the feet. It may be in the head, or it may be in the intestinal tract, the kidneys, the heart, or in a diseased joint.

It is known beyond question that disease germs from necrosed bone, surrounding and caused by a tooth in a chronic abscessed condition are taken up in the circulation of the blood and may find lodgment in some remote part of the body, where conditions are favorable for their propagation and there produce trouble that has never through ordinary diagnosis been traced to the mouth or teeth for its origin.

The length of time that a mouth in an unhealthy condition and with decayed teeth can continue before showing a marked effect upon the general health depends upon the power of resistance and the constitution of the individual.

It is impossible in an article of this kind to go into all the details of the train of evils that may result from a neglected condition of the mouth and the teeth. It is sufficient that they are known to exist and are so recognized by leading men of the medical and dental professions. The mouth hygiene movement is yet in its infancy, but the knowledge that has been gained and is being spread before the people is doing great good, and the next few years will show wonderful changes in the knowledge of the public upon this subject.

The direct penalties that one must pay for neglect of the mouth and teeth through decayed teeth, toothache and eventual loss of the teeth, are pretty

well known to every one, though it is not often realized until so late that serious damage has been done, but it would seem that with what is now common knowledge upon the subject, that everyone would be impressed with the necessity for devoting sufficient time each day to accomplish the cleanliness that is essential to a healthy condition of the mouth.

The germ which produces decay in the teeth has its origin in soft deposits and in decomposing particles of food which lodge about and in the spaces between the teeth. Details of the process by which this decay takes place are unnecessary here. The cause is indisputable. To prevent it, the all-important factor is cleanliness. If absolute cleanliness, or asepsis, could be maintained within the mouth the problem would be solved. To attain as nearly as possible this condition is what each must strive for. It is our purpose here to offer a few suggestions as to one of the ways to accomplish the best results. There are other ways, but this is the best way that we have been able to work out.

The first step to be taken is to have all necessary fillings taken care of and the mouth put in thorough order by a capable dentist. The services of a dentist at regular intervals (the duration of which he can best decide upon) to examine the mouth and give the necessary attention promptly, are essential. The old-time dread of visiting the dentist should be, and is largely, a thing of the past. There rarely is ground for it in modern dentistry, and even when some pain may be unavoidable there is much more to be dreaded by not going than there need be in going.

The toothbrush comes next, and until there is something better discovered to take the place, it will continue to be one of the important factors in the practical cleaning of the mouth and teeth. It is preferable where possible for every person to have two toothbrushes in commission at a time, so that each may be kept clean and have time to dry out. It is a good plan to have them vary a little in form, and at least one of them should have the bristles of different lengths, arranged in tufts or ridges. The brush should not be so large nor so stiff in the bristles as to be uncomfortable to use.

The teeth should in the main be brushed up and down, with a rolling motion, and as a rule bring the brush from the gums down on to the teeth, not brush against the margin of the gums. So far as possible, touch all of the surfaces of each tooth that the brush is accessible to. Think of each tooth as you do it until the habit is formed. The teeth should be brushed at least twice a day—first, as part of the morning toilet with a proper dentifrice, as an act of common cleanliness and for the good-will of your associates; at night, upon retiring, the teeth should be brushed as a part of the procedure in connection with floss silk in removing all particles of food from around and between the teeth.

A good dentifrice that has thorough cleansing properties without injurious qualities should be used at least once a day. The two efficient materials for this purpose are the finest grade of precipitated chalk and a mild neutral soap. They are the best materials known to the world to-day for the purpose. They are not injurious and they will clean the teeth and mouth thoroughly. The chalk must be of the finest quality and the soap a mild neutral one. They are better to be combined, and this can be done in form of either a paste or a soap. Johnson & Johnson put up both forms—the paste under the name of Zonweiss

and the soap under the name of Lister's Tooth Soap.

There is no mystery in connection with the combination of the ingredients. They are simply the finest grade of precipitated chalk and neutral soap flavored with essential oils to make them agreeable to the taste and possibly add to their efficiency.

In Zonweiss the chalk predominates; in Lister's Tooth Soap the soap predominates. Neither one is medicated. They simply clean the teeth thoroughly and without injury. No strongly medicated dentifrice should be used regularly. When medication is needed in the mouth let it be under you dentist's direction.

Mysterious compounds that are claimed to give marvelous results as dentifrices, prevent decay, destroy germ life, etc., are a delusion. If they could do what they are said to do they would be dangerous. Cleanliness without injury is all that is necessary to accomplish.

Care should be taken to keep the tooth brushes clean. Two brushes for each person are preferable, as already mentioned. After using, the brush should be thoroughly rinsed and placed where it will dry quickly—if possible in direct sunlight. Never shut up a wet brush in a close receptacle, though do not expose it to dust more than is necessary. A thin linen or cotton cloth bag with stitched pockets for each brush, and the bag hung so that it gets the air, is a good arrangement.

The brush may be sufficiently sterilized occasionally in a simple way that will answer for all practical purposes. One way is to wash it out with hot water and a strong laundry soap, not leaving it in the hot water long enough to injure the setting of the bristles.

Another way, requiring less labor, and even more effective, is to immerse the brush for a half hour or more in an open-mouth bottle containing a solution made of one part of Synol liquid soap (Johnson & Johnson) and nine parts of water, or a solution of one part Camphenol (Johnson & Johnson) to nineteen parts water; then rinsing the brush and drying it. Any one of these methods is all that is necessary, and the tooth brush may be relied upon as a safe weapon in the defense of health.

The next step, and the most important factor in the prevention of decay, is the use of dental floss silk, carefully drawn between the teeth for the purpose of removing all particles of food that lodge in the spaces, and cleaning the proximal surfaces where the brush will not penetrate.

The thorough use of dental floss silk three times a day, after meals, every day in the year, is of more importance in preventing the start of decay and preserving the fillings that you already have than any one thing you can do in the care of your teeth.

The brush is used for common cleanliness of the mouth, but even when the mouth looks and feels clean, the spaces between the teeth may be in a condition most favorable to the propagation of the germs producing decay, unless floss silk is used to clean them. There is no mechanical contrivances for using floss silk between the teeth that is equal to the delicate touch of the fingers.

Take about one foot length of floss, wrap one end around the point of the first finger of the left hand, using the second finger of the left hand to guide the silk, hold the other end of the floss with a wrap on the second finger of the right hand, using the first finger of the right hand to guide it, draw the silk through all of the spaces with a lifting motion so as to engage and remove all particles of food. Be careful not to injure the gums. A little practice makes

this a very simple operation, and it is quickly done.

Toothpicks will not accomplish what floss silk does, and with wood toothpicks injury is likely to be done to the gums.

Pocket Floss (J. & J.) in small flat metal boxes is a particularly convenient form for the pocket. The best forms for general toilet use are Lister Floss and the New Era Floss (J. & J.), both in aseptic glass containers that keep the floss in a thoroughly clean condition.

Now, just a word to mothers regarding the care of children's teeth. Any trouble that may arise during the period of teething should, of course, be brought to the attention of the physician or dentist. The first, or temporary, teeth of the child should have the same attention given to them, as to proper care and cleanliness, that you give to your own teeth. The mother should attend to removing food deposits as far as possible up to the time the child can be taught to use a small soft brush, and this should be at an early age. The temporary teeth require care to preserve them for the length of time that nature intends them to last, and they are necessary to the proper erupting of the permanent teeth.

Remember that during the sixth year the first permanent teeth make their appearance back of the molars, or "back teeth" of the temporary set. These sixth-year molars are frequently sacrificed for want of care, because the mother does not realize that they are the first of the permanent teeth. Their care and preservation is most important. Teach the child to rinse its mouth thoroughly, to force the water between the teeth, as well as to use the brush.

Prospective mothers should have their teeth in good condition at the start and give them particular care, for during the period of pregnancy the teeth are more subject to decay, and may give trouble at a time when it is difficult to have them properly treated.

This about covers the subject of the daily care of the teeth.

Where a simple detergent wash is desired for the mouth and gums in case of soreness, and the mouth has been put in order by your dentist, a very mild solution of Camphenol, one-half teaspoonful only in a pint of water, will be found of value, and is an efficient deodorant if needed in that way.

It takes persistent care to keep the mouth in proper condition—systematic and thorough care—but the habit is easily formed and takes but a few minutes each day. It becomes as much a part of the toilet as washing the face and hands, and must be done thoroughly today and every day in the year.

You collect great, big pay yourself for the time spent, and no one can take it away from you. You have a "good feeling in your mouth" that adds to your self-respect, and remember, a healthy mouth is an important factor in maintaining a healthy body.

Let the habit be so firmly fixed that it cannot be lost.

## DR. BILLY SUNDRIED

The average man will give an attorney from three to five thousand dollars, together with a lifetime of praise, to keep him out of the penitentiary for from two to ten years, yet at the same time will raise a phosphorescent glow and a kick that can be heard around the world, if a doctor charges him fifty or a hundred dollars to keep him out of Hell for a lifetime. We are the only people, under God's ethereal tent to-day, who keep open shop for twenty-four hours a day, for three hundred and sixty-five days each year. We are also the only laborers who keep on working for people who do not pay.—*Bulletin Lawrence Co. Med. Soc'y via Med. Council.*

## SURGICAL GAUZE

### The Most Convenient and the Most Useful Dressing Material Known As Prepared At the Johnson & Johnson Laboratories.

(Contribution from the Scientific Department of Johnson & Johnson)

Gauze cloth, otherwise known as surgical gauze, came into use as a wound dressing with Listerism. Lister first applied lint, afterwards what was known as cheese-cloth, which by evolution was converted into surgical gauze, and finally he evolved a combination of absorbent gauze and cotton. The tendency of modern surgical technique has been to simplify dressings. All other substances have, to a large extent, been abandoned, and gauze now constitutes the major dressing material.

A good quality surgical gauze has numerous and obvious advantages over any other material for this purpose. It is highly absorbent, pliable, with an open texture that is firm and strong. It is free from the loose fibres and irritating particles found in unspun cotton. It is cool, light and readily shaped into required forms.

Surgical gauze in the operating room acts primarily as a covering and protective, and if of sufficient thickness filters the external air that passes through to the wound. It is firm enough to bring together any incised or separated parts. Its fibres act, to a certain extent, as plugs or compresses to the small blood vessels which may have been severed. The absorptive power of good gauze is ample to receive and retain a sufficient quantity of blood to coagulate and coat the injured part and thereby check the flow.

Gauze is also employed to absorb discharges which would infect surrounding area if not seized upon by an absorbent and removed. In the early technique antiseptics or disinfectants were used to impregnate gauze dressings. In modern surgery a piece of sterile gauze is sometimes the only dressing employed.

Taken altogether, surgical gauze may be considered the most convenient and the most useful dressing material now known.

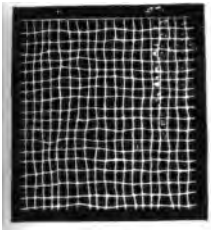
Gauze cloth in the cotton trade is known as cheese-cloth, tobacco cloth or unbleached gauze, and is quite distinct from surgical gauze, although large quantities of the former are used for surgical purposes. In England and on the Continent gauze is spun and woven solely for surgical uses, and there is one such maker in the United States.

The method of preparing cotton fibre for manufacture into surgical gauze involves a long series of mechanical and chemical processes, a description of which lies outside of our present purpose.

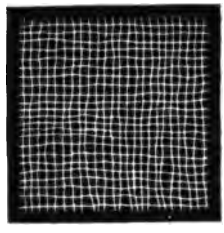
In the surgical gauzes as found on the market there is a marked variation in the length of the fibre, the size and weight of the thread, yardage per pound, and other physical and chemical characteristics. The earlier surgical gauzes were made of Egyptian cotton, carried an equal number of threads each way, and were hand-finished. The hand-finish kept the threads straight; the final product was less white, but more elastic.

In some samples of gauze in our market there will be found certain dressings or loadings added to improve appearance, to increase the weight, to assist in holding the gauze out to its full width, and the like.

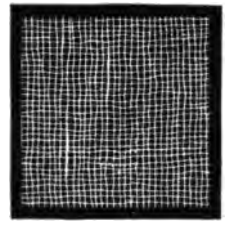
In the cotton trade, gauze and cloths of this character are standardized by taking a square inch and counting the number of threads. For example, a high-grade gauze carrying forty longitudinal and forty-four cross threads per square inch, carried eighty-four inches of thread.



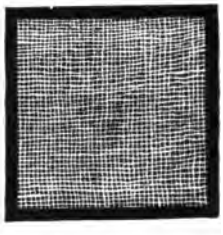
Brunswick Gauze
20x12 threads to inch



**Raritan Gauze**
**24x20 threads to inch**



**Belleview Gauze**
**28x24 threads to inch**



Bandage Gauze
44x40 threads to inch

For the most part the so-called manufacturers of surgical gauze purchase their supplies of woven gauze, gray or bleached, from various cotton mills. These mills supply some nineteen grades, beginning with a gauze carrying as little as twenty threads by ten, or thirty threads per square inch.

It should be noted that very little surgical gauze in the market is full thirty-six inches in width. This is accounted for by the fact that these goods are woven in the gray thirty-six inches wide, and it is not practicable to bleach the goods, render them absorbent and retain their full width. The usual variation is about one inch per yard. In other words, the average width will be found to be about thirty-five inches.

The following table shows the threads per inch, the average yardage per pound of the best known grades of surgical gauze:

Surgical Gauze

| Threads per Inch. | Yards per Pound |
|---|---|
| 44 x 40..... | 9.38 |
| 32 x 26..... | 14.81 |
| 28 x 24..... | 16.00 |
| 24 x 20..... | 18.83 |
| 20 x 12..... | 23.20 |

The National Formulary (first edition), adopted as a standard two brands, Lehigh E, and Stillwater. These grades (now practically out of the market) contained about sixty-four threads per square inch, and their weight was a little less than 800 grains to the square yard.

Several attempts have been made looking towards a standardization of surgical gauze. In these attempts at standardization our Scientific Department has been active.

The Bureau of Municipal Research of New York City has adopted a standard for surgical gauze substantially as follows:

"The gauze shall count in the finished state not less than the total number of threads per square inch specified; shall not exceed the yardage per pound specified; it shall be free from loadings, and shall be acceptable by the Bureau as first quality in every respect. Gauze delivered under these specifications is required to be made from clean, white,

long cotton fibre, fully bleached and absorbent, of soft finish, and upon extraction with acidulated water (two per cent. hydrochloric acid) it shall show a loss of not more than one per cent., and the reaction shall show no reaction for starch, soap, dextrin, glue or other filling."

The object of the foregoing test—extraction with acidulated water—is to prevent the addition of starch, soap, dextrin or glue for making weight, increasing the apparent size of thread, etc.

The evolution of surgical gauze

The Medical Supply Depot of the United States Army has adopted the following specifications:

PLAIN ABSORBENT GAUZE

Medical Supply Depot, U. S. Army

1. Gauze, plain, 1 yard wide, 28x24 mesh in the gray, minimum weight, 27 grams; maximum, 31.5 grams, per yard (16.8 to 14.4 yards per pound), in 25-yard pieces, each piece to be put up in a sealed carton; packed 75 cartons in box, boxes to be made of ¾-inch (finished size) white pine or spruce lumber.

2. Free from loading material and visible particles other than cotton, and be colorless.

3. Two yards boiled in 500 c.c. of distilled water for one-half hour, boiling distilled water being added at intervals, to replace that lost by evaporation, the water pressed out, rinsed with sufficient boiling distilled water to measure 505 c.c. cooled to 25° C. and made up to 500 c.c. with distilled water at 25° C., shall yield a turbidity not more than that produced by 0.030 gram of infusorial earth (passed through a 200-mesh sieve), well shaken in 500 c.c. of distilled water in a colorless glass bottle, when examined by transmitted light.

4. Two yards boiled in 500 c.c. neutral distilled water for one-half hour, boiling distilled water being added at intervals to replace that lost by evaporation, the water pressed out, cooled to 25° C., and divided into two equal parts; one part shall be neutral to three drops of phenolphthalein test solution, the other to one drop of methyl orange test solution.

5. Two yards boiled in 500 c.c. distilled water for one-half hour, boiling distilled water being added at intervals to keep the volume at the original quantity, the water pressed out and rinsing twice with 250 c.c. portions of boiling distilled water, the water pressed out and the total volume evaporated to dryness in a platinum dish and kept at 100° C. until constant in weight, shall yield not more than 0.13 per cent. by weight of residue, of which not more than 0.045 per cent. shall be inorganic.

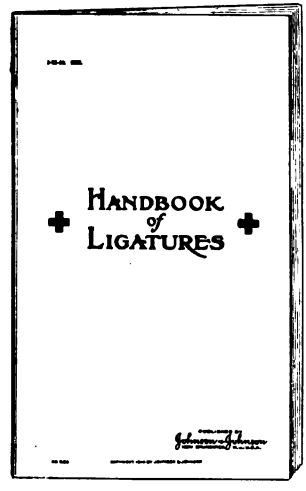
6. One yard extracted with 95 per cent. ethyl alcohol in a Soxhlet extractor for five hours shall yield a solid extract, when dried at 100° C. of not more than 0.55 per cent. by weight.

7. One yard extracted with ethyl ether in a Soxhlet extractor for five hours shall yield a solid extract when dried at 100° C. of not more than 0.55 per cent. by weight.

8. One yard incinerated in a platinum crucible shall yield not more than 0.055 per cent. by weight of ash, containing potassium, sodium, magnesium, calcium, iron and aluminum, which were originally in combination with hydrochloric, sulphuric, and phosphoric acids.

9. One yard folded into a square, the surface of which measures 16 square inches, with the loose ends loosely joined by No. 30 white cotton thread, when held nearly in contact with the surface of distilled water and dropped thereon, at 25° C. temperature, shall be completely submerged in five seconds.

The surgical gauze of Johnson & Johnson in every grade will fully, and in every respect, meet the above standards.




The new and revised edition of this book sent on request

## HANDBOOK OF LIGATURES

Johnson & Johnson have published a monograph on ligatures which should be in the hands of every surgeon and upon the shelves of every hospital's library. It is called "Handbook of Ligatures," contains 48 pages and a cover and is illustrated. The Johnson & Johnson catgut ligatures are recognized as the best available, being prepared under absolutely aseptic conditions, handled by experts from the moment they leave the animal to the time they are sealed in glass tubes or double envelopes. There is no comparison between their product and the ordinary commercial slaughter-house catgut. The Johnson & Johnson product has the highest testimonials from surgeons and hospitals.

Believing that the medical profession is interested in the preparation of ligatures, Johnson & Johnson have issued this Handbook. It is written with sincerity and scientific accuracy, reveals the unsanitary and disgusting conditions under which catgut was so long prepared, and describes the new sanitary process by which all chance of infection remaining in the tightly wound strands of sheep intestines is removed. The illustrations show the laboratories where the ligatures are prepared, the material in its raw and finished state, the process of chromicizing or hardening, the method of conducting the bacteriological tests, the various sizes, the apparatus for testing the tensile strength of ligatures, the proper method of tying the knot, the proper method of opening the envelopes. A list of the various ligatures prepared by Johnson & Johnson is given.

The "Handbook of Ligatures" will gladly be sent to any physician, nurse or hospital superintendent interested upon receipt of a request to the Scientific Department of Johnson & Johnson.

—The leading feature of Red Cross Absorbent Cotton is that it is prepared in a laboratory where the law of surgical cleanliness guides and overrules all things else.

## PHYSICIAN PRAISES SYNOL

Dr. W. S. Randolph, specialist in typhoid fever, of Oakhurst, Texas, has found Synol Soap of inestimable value in typhoid cases, not losing one case in over one hundred treated. He writes:

"During a practice extending over a period of more than thirty years I have had occasion to test the merits of a large number of soaps, among the number Synol Soap, manufactured by Johnson & Johnson, of New Brunswick, N. J. I must say, in justice to its true and intrinsic merits, that I have, after a thorough test, found it superior to all others I have ever used and can unqualifiedly recommend it to the confidence of my colleagues everywhere. I have treated a large number of typhoid patients during my career as a physician most successfully and I have adopted the rule to have my patients washed thoroughly daily with warm water and Synol Soap. It thoroughly cleanses the skin and imparts a sense of well-being to the patient that nothing else does so well.

"I attribute much of the excellent success I have had in the treatment of typhoid fever to having my patient bathed daily with this valuable soap.

"In this section there are many cases of tetter, or salt rheum. In treating these cases, which are often very obstinate, I invariably have the patient wash well with Synol Soap before applying the ointment. Then the administration of arsenic and sulphur effects a rapid cure. Before I began to use Synol Soap in these cases as an accessory to the general treatment, I found the cases more difficult to combat.

"Synol Soap has very many valuable uses, I have found, but in this short letter I have space to mention only a few, but these will suffice to call the attention of the profession to its value, to pay a true tribute to a most worthy product."

---

## VACCINATION SHIELDS

Dr. J. Spencer Callen, of Shenandoah, Pa., has found that Johnson & Johnson corn pads make excellent and economical vaccination shields. His experience will interest all of the physicians of the country and show some of them how they can save time in handling vaccination cases. Dr. Callen writes:

"Believing it wise and a pleasure to pass a good thing along, I wish to state that as a busy physician I have economized much precious time by using hundreds of your round corn pads to encircle and protect vaccination scars.

"After each vaccination I use a pad, directing that it be removed at bedtime, or upon arising in the morning, and be thrown in the fire.

"Experience has taught me that it is wise to explicitly so direct to avoid foolishness of continuing to wear it or the nightly removing and the morning reapplication of the pad.

"In using these pads I can immediately dismiss the patient, who must otherwise remain in office or reception room twenty minutes for the virus to dry to secure its efficiency; unless we put a more expensive shield over the scar.

"The thin pads are better than the thicker kind, and the round better than the oval or square, and the small or corn plasters better than the bunion plasters for my use.

"My idea has been adopted with pleasure by most of our town physicians and by my personal acquaintances. My suggestion is made only because of my good-will to the other man."

## VACCINATION

Dr. Le Grand Kerr, of Brooklyn, suggests the application of vaccine virus subcutaneously, especially in the case of children. He uses an ordinary hypodermic syringe with a very fine needle. One drop of the virus is shaken up with five to ten minims of a normal salt solution, and placed in the barrel of the syringe. The site chosen for injection is thoroughly cleansed with soap and alcohol. The point of the needle is then introduced as nearly parallel with the surface of the skin as possible, so that before the virus is released the needle may be raised and its exact situation observed through the skin.

Dr. Kerr has used three sites for injection—the back, just below the angle of the scapula; the upper portion of the buttocks, and the outer aspect of the thigh, about its upper third, the last being the best situation for children.

The doctor states that by this method the inflammatory areola is less widespread, and the itching is practically absent; that with this method there is rarely a rupture of the vesicle, but instead a gradual transition from an unbroken vesicle to a protecting scab. The resulting scar is typical but smaller.

The doctor further points out that in children the rapidity of the procedure, the obviation of scarification and rubbing in of the virus, is important; that primary cleanliness is conserved, protection is assured against the usual itching, and consequently there is no scratching and spreading. The protecting scab offers further insurance against infection.

The procedure diminishes the opportunity for primary and secondary infection.

---

—Physiology is the sum of scientific knowledge concerning living beings.

## A NEW USE FOR "Z O"

Dr. Charles W. Nehl, of 4139 Carter Avenue, St. Louis, Mo., has found "Z O" Adhesive Plaster an effective means of removing gunpowder from the face. Under recent date he writes:

"Having used your 'Z O' Plaster for years, I thought it might be interesting to give you a new use of J. & J. 'Z O' Plaster.

"A boy came into my office with his entire face studded with powder blown from a blank cartridge with which he had been playing. The question to be solved was how to get these fragments out of the skin. I tried various means, also trying to pick them out. This seemed an endless and painful job, so I thought of some other means to get them out quickly. I naturally thought of Johnson & Johnson's 'Z O' Plaster, so I put same to use. I saturated a towel in hot water, applied same to different parts, and immediately put small strips of 'Z O' Plaster to different parts and left them applied for twenty-four hours, when, to my joy, it did exactly what I thought could be done with J. & J. 'Z O' Plaster. These strips when removed were literally covered with fragments of powder which could be clearly seen under a magnifying glass. The entire face, ears, neck, nose, etc., were cleaned up in a hurry.

"The above new application of your 'Z O' Plaster may not be of much use to you, or probably of no interest, yet it might help some one out of a difficulty. I have mentioned the above to several friend physicians and surgeons, who thought it was an excellent idea, especially in view of the fact that it does not scar the face and does the work quickly. The 'Z O' seems to open the tissue surrounding the powder, thus allowing it to adhere to the plaster."

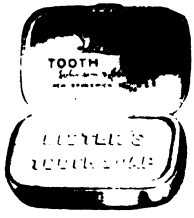
---

—The atom is the unit of matter. The electron is the unit of force. Matter and force are merely different manifestations of the same thing.

---

—Papoid, when externally applied, accomplished its physiological work by erosion, manifesting with marked vigor its solvent and detergent energy.

# Aids to Mouth Hygiene



**Four Exponents of Cleanliness Without Injury**

ZONWEISS and LISTER'S TOOTH SOAP are made of the finest grade of precipitated chalk and neutral soap flavored with essential oils to make them agreeable to the taste.

In Zonweiss, which is a paste, the chalk predominates. In Lister's Tooth Soap the soap predominates. Neither one is medicated. They simply clean the teeth thoroughly and without injury.

POCKET FLOSS (J & J) is sold in small flat metal boxes and LISTER FLOSS and NEW ERA FLOSS (J & J) are sold in aseptic glass containers.

Where a simple detergent wash is desired for the mouth and gums a very mild solution of Camphenol will be found of value. It is also an efficient deodorant.

JOHNSON & JOHNSON
New Brunswick, N. J.

Series VII

Number Seven

BOSTON MEDICAL
MAY 16 1917

# RED CROSS NOTES

PUBLISHED BY Johnson & Johnson
NEW BRUNSWICK, N. J., U.S.A.

# The Check Tests

THE bacteriological tests employed in the Johnson & Johnson laboratories are the most perfect means to check the efficiency of the sterilization process of ligatures that could be devised. Each test is a guarantee of the perfection of the sterilization.

Before any finished ligatures are sent from our laboratory they are subjected to the following tests by the bacteriological laboratory:

Samples are taken from each batch of finished ligatures.

Under proper precautions and aseptic conditions the package is opened and the ligature strand is removed from its container with sterilized forceps and dropped into a tube of prepared sterile nutrient broth.

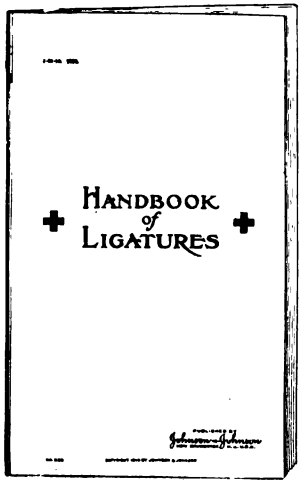
This is subjected to the temperature of the culture chamber for a sufficient time.

If no growth has taken place it is considered conclusive proof that the whole of the batch is sterile, and the packages are labeled with the test number.

These tests are supplemented from time to time by a microscopical examination, by a process of infecting the ligature material with test organisms and passing the infected ligature through the sterilization processes.

If no growth has taken place in the portion of infected material that has passed through the sterilization process, we are certain that sterilization has been complete in all of the ligatures.

Johnson & Johnson's vigilance in handling catgut never ceases from the second the intestines leave the animal until the ligatures are placed in the surgeon's hands for use. The surgeon can use them with absolute confidence.




Send for the "Handbook of Ligatures". By text and by picture the book shows our whole unique process of preparing catgut ligatures and contains many informing articles on catgut absorption, resorption, the method of chromicizing, the new and rational scale for measurement and other information. It will be sent free on request. Address

Scientific Department
JOHNSON & JOHNSON
New Brunswick, N. J.

# RED CROSS NOTES

COPYRIGHT 1916 BY JOHNSON & JOHNSON

SERIES VII NEW BRUNSWICK, N. J. NUMBER SEVEN

RED CROSS NOTES

Published by JOHNSON & JOHNSON, New Brunswick, N. J., U. S. A.

Fred B. Kilmer, Editor

This publication is issued from the laboratories of the publishers with the intent to give, in brief, items of interest and reports of original research along the line of the particular branches of the art in which they labor.

Persons receiving *Red Cross Notes* will confer a favor by notifying the publishers of any inaccuracy in the address on the wrapper and of any change of their address.

## The Purpose of This Issue

The importance of adhesive plaster in present day surgery and in therapy is acknowledged. This is due in part to the amplification and evolution of procedure, wherein the ingenuity of the surgeon has found many new and extended uses for this plaster, and in part to the fact that the forms of adhesive plaster have been modified and improved so as to admit of a larger range of application than that which formerly obtained.

It is to be noted that the evolution of the art of plaster making has entirely changed the character of adhesive plaster—a bland, non-irritating adhesive plaster has been produced—aseptic adhesive plaster has been made possible.

From our Laboratory there have been issued from time to time, monographs and pamphlets illustrating and describing the manifold uses of adhesive plaster. These issues have become exhausted, and in response to many inquiries we take occasion in this issue of the Notes to re-publish a number of the more important uses for adhesive plaster, together with a number of additions.

The methods shown herein are in the main those which have been directly contributed by able authorities in this country and abroad. The illustrations are reproduced directly from photographs or drawings made in the operating room.

The editor and the publishers acknowledge their indebtedness to the authorities quoted, as well as the many hospitals, surgeons and practitioners who have assisted in the preparation of these pages.

## CONTINUOUS EXTENSION

**Adhesive Plaster Is An Essential Part of All Forms of Apparatus for Continuous Extension, Says Dr. Steibel of Paris in Thesis on Dr. Barety's Work.**

An interesting event in the surgical practice in France has been the publication of a thesis by Dr. Raymond-Jean-Theophile Steibel, Doctor of the Faculty of Medicine in Paris, entitled, "La Véritable Extension Continue par l'Appariel de Jean Paul Barety."

In this thesis Dr. Steibel gives an extended explanation of the apparatus and the methods of Dr. Barety in cases of fracture of the femur and coxalgies. Incidentally the publication pays great tribute to Dr. Jean Paul Barety of Nice, France, who prior to his death had devoted his life and his ingenuity to the improvement of apparatus for continuous extension. Notwithstanding his untimely death at the age of twenty-five, his biographer states that "the essential qualities of a man of French science were in Jean Paul Barety. His work deserves the highest consideration. His death was cruel for his friends and cruel for science."

The following has been translated for Red Cross Notes from the thesis cited:

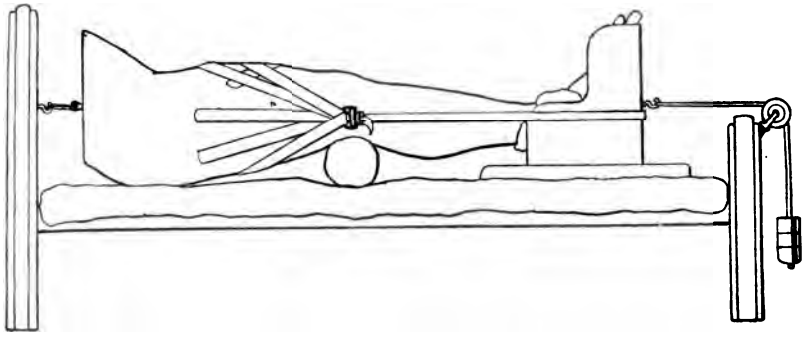
Adhesive plaster is an essential part of all forms of apparatus for continuous extension. It is through the medium of adhesive plaster that one can exercise traction of the limb and on its quality depends the greatest part of the success. The inherent defects of the adhesive plaster used up to the present time are sufficient in themselves to explain why the process of traction by adhesive straps has been so often criticized and abandoned. The adhesive often used in a little time caused erymatous excoriation of the skin, rendering it necessary to suspend the application of the extension.

Diachylon plaster, the principal element of all so-called adhesive plasters, has a very complicated formula. The formulas laid down in the treatise on pharmacy do not allow of any purification of the ingredients, nor do they assure the sterility or the cleanliness of the product. It necessarily follows that the prolonged application of this product to the skin during weeks and months causes all kinds of irritation, itching and even suppuration. This undoubtedly is the principal cause that has led to the abandonment of this system of traction.

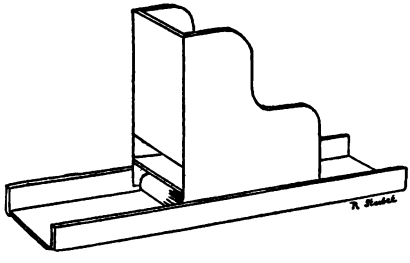
Suggestions have been made for the use of trusses and dressings more or less complicated, often constricting and usually expensive and at times intolerable for the patient.

Jean Paul Barety, realizing this condition and attributing it to the fault of the adhesive plaster, determined to find a different product prepared with more system and less harmful. He first sought to simplify the old formula and this without success. The products first used by him lacked adhesiveness, their application was modified by the surrounding temperature, a thousand precautions were necessary in order to make their application successful. During these investigations, Dr. Barety received one morning by chance a sample of American adhesive plaster of the manufacture of Johnson & Johnson, New Brunswick, N. J., designated as Z O Adhesive Plaster. Dr. Barety made use of this plaster and the results were such that from that day he no longer used any other adhesive.

Three years ago we made investigations to ascertain what was the composition of this product, its method of manufacture and utilization. The results of these investigations we are



Traction apparatus devised by Dr. Jean Paul Barety. The adhesive straps pass through a buckle to which is attached an elastic reaching to the roller trough at the foot.



Roller trough footrest of Dr. Barety's apparatus.

happy to make known as giving the best results. From the manufacturers we have learned that in the preparation of Z O Plaster, improvements have been made not only in the quality of the rubber used but in the preparation of the other substances which make up the compound, and in these processes the impurities and harmful elements which make up the ordinary adhesives of commerce have been eliminated. The perfection of processes not only assures the adhesiveness of the mass but the efficiency of the plasters and produces a product which, at no matter what the temperature, the adhesiveness is quite rapid and the heat of the body is sufficient to increase without doing away with any of the qualities of the product.

In the course of our studies we have tested some of the other products which we here cite. The table here shown is the result of applying the adhesive strips on a cylinder of thin rubber, the hollow of which was filled with fine sand, a depression being made on the surface in the axis of the cylinder.

| Sample Nos. | Surface application in square centimeters | Traction in grams | Adhesiveness in square centimeters |
|---|---|---|---|
| 1..... | 30 | 4.750 | 158.33 |
| 2..... | 20 | 6.500 | 325 |
| 3..... | 20 | 8.980 | 449 |
| 4..... | 40 | 5.890 | 147.25 |
| 5..... | 25 | 7.600 | 344 |
| 6..... | 20 | 5.900 | 295 |

In the course of our observations and as a result of these additional tests we have been able to make on the different adhesive products, we have never found a product whose fabrication is as perfect and as constant in its quality as Z O Adhesive Plaster. Each time we have used this adhesive plaster we have always been able to establish our traction as strong as we had ever seen it, without ever being subject to the annoyance of slipping or non-adhesiveness or having to resort to any procedure. Finally, in the use of Z O Adhesive Plaster we have never had any erythema or excoriation, nor have we even been subjected

to the necessity of suspending the application of the extension. In a word, Z O is a perfect product and all surgeons who have attempted to apply the apparatus devised by Dr. Barety for continuous extension for fractures of the thigh or coxalgia have the greatest interest and the greatest satisfaction in using this product, which is no other than No. 3 in the table shown.

## THE NEW PHARMACOPEIA

The Ninth Revision of the United States Pharmacopeia has been compiled and became technically official September 1, 1916. A delay in publication, however, has prevented the actual application of the revision by druggists and manufacturers. This revision of the Pharmacopeia is important from the fact that under the National Food and Drugs Act the work is made the standard for all drugs and medicines embraced therein.

The revision is also important from the fact that the eminent committee of revision has spent over six years of most arduous labor in putting it together. It will be found to contain the latest and the best in the realm of pharmacy and materia medica. In addition to the usual matter found in the Pharmacopeia, such as standards of purity, the present revision includes test solutions, volumetric solutions, processes of biological assay, diagnostical reagents, general test tables, etc.

It is needless to state that the preparations of such manufacturers as Johnson & Johnson will be found in all respects to comply with the Pharmacopeia, and all material entering into their preparations and the finished products are judged by the standard outlined in this work. Indeed, the laboratory of Johnson & Johnson has been privileged to assist the committee in this work of revision. We believe that every physician should be familiar with the Pharmacopeia, especially in respect to the standard strength of preparations, standards of purity, etc.

## ADHESIVE PLASTER

At the present day when the term "adhesive plaster" is used it is intended to mean a plaster made with an india-rubber mass, and this form of plaster is supplied without a thought that there may be another kind.

The adhesive plaster masses of the Pharmacopeia are composed for the most part of resins, lead and diachylon plaster, with the addition of waxes, etc. Plasters of this character are not adhesive at the temperature of the body and require the use of artificial heat and other expedients to render them adhesive.

Adhesive plaster made with a rubber mass, as now produced, will adhere at all degrees of temperature. The evolution in the art of plaster-making has produced a bland, non-irritating adhesive plaster, and, indeed, aseptic adhesive plaster has been made possible. This evolution has re-enthroned and made adhesive plaster an important adjunct in present-day surgery and therapy.

In the technique of surgery, adhesive plaster plays an important part—it is at once a cover, a dressing, a protective, a suture, an absorbent, and an article of unlimited application.

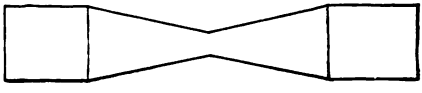
The advance of surgery and the increase of operative procedure have increased the consumption of the modern india-rubber base adhesive plaster. It is also worthy of note that in the trend of modern treatment adhesive plaster has been accorded a high place in therapy.

—Synol Soap is made for doctors.

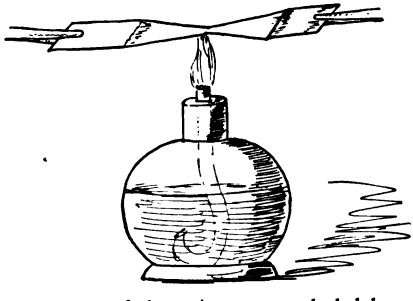
## WOUND CLOSURE

**The Method of Wound Closure With Michel Clips and Z O Plaster Used by the Late Dr. Robert H. M. Dawbarn of New York.**

For some time before his death Dr. Robert H. M. Dawbarn was using, experimentally, in his work in the City Hospital of New York and in other institutions, a method of wound closure



Strip pattern laid out in lead pencil.



Sterilization of the strip over an alcohol lamp.

which was described at some length in Red Cross Notes No. 4, Series VII. As that issue has become exhausted, the salient points of the method are here repeated by request.

Dr. Dawbarn used as a method of wound closing Michel clips and Z O Adhesive Plaster, alternately applied. He used this method of wound closure for every conceivable operation, with signal success and satisfactory cosmetic results.

For suturing the subcutaneous tissues the skin edges are closely proximated, with small forceps, and every inch along the line of incision a Michel clamp is attached. Between each clamp the skin

Application of the finished strips.

is drawn together by Z O adhesive strips, which are sterilized over an alcohol flame. This gives a minimum of adhesive surface directly over the wound, with a maximum of traction on the skin. The Michel clamps are removed after twenty-four hours, and the Z O strips after ten days.

The strips of Z O Adhesive are made by taking a large strip of Z O Adhesive Plaster, from 3½ to 5 inches wide, laying it on a glass plate, adhesive face downward. Over this, in the center, a smaller reinforcing strip, from 1½ to 2½ inches wide, is laid for the purpose of giving additional strength. The pattern of the strips is laid out in lead pencil and then cut out.

The pattern for cutting the strips is shown in the accompanying cut.

Before applying the strip of adhesive plaster, Dr. Dawbarn sterilized the adhesive surface, over an alcohol flame, at the point where the plaster was to cover the point.

Dr. Dawbarn demonstrated that this method of wound closure preserves the integrity of the skin, prevents stitch abscess, does away with the painful removal of stitches and leaves a very small scar.

---

—Red Cross Cotton is standard.

## WHAT IS ADHESIVE PLASTER?

Some confusion has existed from the use, without a qualifying designation, of the general term "Adhesive plaster." According to the U. S. Pharmacopeia (8th revision) "Adhesive plaster" is a combination of lead plaster and petrolatum, with an insignificant percentage of india-rubber. In the British Pharmacopeia "Adhesive plaster" is directed to be made of lead plaster, resin and soap. The "Adhesive plaster" of the National Formulary is composed of lead plaster, resin and yellow wax. "Maw's Adhesive Plaster" and "De La Cour's Adhesive Plaster" are of the last type.

The official lead base plaster is not adhesive at the temperature of the body, and must be heated in order to adhere.

Rubber adhesive plaster is free from the objections to resin plaster, and is ready for application without any preparation. These advantages have led surgeons of the present day to discard almost entirely the official plaster from their armamentarium, and now when adhesive plaster is called for the rubber adhesive is supplied without a thought that there may be another kind.

The adhesive plasters of Johnson & Johnson will be found to fulfill every requirement. They are adhesive at all degrees of atmospheric temperature; they retain their adhesiveness for a long time under proper precautions; they are prepared in such a variety of forms that every desirable indication may be met; finally, as a matter of no small importance, they are not affected by moisture. To preserve these qualities adhesive plaster should be handled with due precaution. Any adhesive plaster mass that is continuously exposed to the influence of the atmosphere will sooner or later deteriorate. In order to prevent this the unused plaster must be carefully rerolled, if it comes in spools, and as an extra precaution a sheet of tin foil may be used to cover the entire roll of plaster.

The spools of Johnson & Johnson Adhesive Plaster are packed in a carton which, in a measure, prevents deterioration. The large sheets which are supplied in boxes should be carefully returned to their containers as soon as practical after use, and it is best to keep them in some place in which they will not be subject to wide variations of temperature.

---

## PHYSICIANS AND FIRST AID

In the literature on the subject of first aid issued by Johnson & Johnson, four things are emphasized—the importance of avoiding manipulation and handling of an injured part, the immediate application of a surgically clean covering, the placing of the injured person in a position of comfort and, above all, the prompt summoning of a physician.

Johnson & Johnson have devised a system of first aid appliances that is scientifically correct and based upon the highest principles of humanity. The system has received the special endorsement of thousands of railroad, mining and factory surgeons, as well as those connected with the fire, police and municipal departments.

This system is fully described in Catalog No. 110. The various cabinets, cases and outfits prepared by Johnson & Johnson are illustrated in colors. A copy will be sent free to any physician or nurse on request. Address Johnson & Johnson, New Brunswick, N. J.

---

—When a rubber adhesive dressing is to be made with strips over an unequal surface, it is a general rule that the narrower it is practical to make the strips the neater and closer fitting will be the dressing.

# Clinical Uses for Adhesive Plaster

Fig. 1 Fig. 2 Fig. 3 Fig. 4

Fig. 1—Dr. John R. Newcomb's method of treating inversion (entropion) and trichiasis. Apply collodion over dressing to prevent wetting of plaster by the tears, etc.

Fig. 2—Method of fastening dark cloth over the eye, leaving eye always ready for inspection.

Fig. 3—Adhesive dressing to protect eye. Watch glass is placed over the eye and the adhesive dressing holds it in place.

Fig. 4—Removing smallpox pittings by means of carbolic acid and adhesive plaster (Dr. John H. Duncan). Cover the pock marks with pure carbolic acid and overlay the adhesive strips.

Fig. 5 Fig. 6 Fig. 7 Fig. 8

Fig. 5—Strapping of shoulder with reinforcement in sprains and dislocation, compression and massage. Front view.

Fig. 6—One-inch strips drawn from a line on level of axillary fold to middle of scapula behind. Back view.

Fig. 7—Half figure of eight reinforcing straps for sprain and dislocation. Place cotton or gauze in axillary fold.

Fig. 8—Figure of eight adhesive plaster strappings for fracture of clavicle.

## TREATMENT OF BURNS

**Dr. Charles A. Parker Describes How He Treats Burn Wounds with Adhesive Strips and Prevents Exuberant Granulations.**

Dr. Charles A. Parker, of Chicago, in the Journal of the American Medical Association, July 3, 1915, speaks of the need for quick healing in order to avoid great deformity and scar tissue which usually follows extensive burns. In burns involving the whole thickness of the skin the throwing off of the slough, which must take place before epidermidalization occurs, may take two or three weeks. When the slough is removed he treats the wound with adhesive strips in the following manner:

After separation of the slough, ribbons of adhesive plaster from 1 to 1¼ inches wide and long enough to encircle the limb and lap slightly were placed around the limb from ankle to perineum, leaving no granulations exposed. To be more explicit, the first band was put around the ankle partly on good skin and partly on the burn, and the ends overlapped an inch or so. The next strip slightly overlapped the upper border of the first one, just enough to keep it from slipping on the wet tissues, and was carried around the limb like the first one. The third followed the second in a similar manner and so on till the area was entirely covered and had enough stability to stay in place and serve its function in keeping in the serum and preventing cells dying from dryness. Over this were placed several layers of gauze to take up the secretion that worked out through between the strips at various places, although no arrangement was made for drainage. At first narrow strips were left open for drainage; but the granulations quickly occupied these areas, became exuberant and bled, and otherwise interfered with the healing; so the spaces were dispensed with entirely, with a much smoother course to the healing. Every day the gauze was changed as it became soiled. Twice a week—on my visiting days—the adhesive plaster was changed. This was easily accomplished by getting the blunt point of scissors under it at one end of the leg and cutting across all strips from the bottom to the top or the top to the bottom of the leg, when the plaster would fall from the leg as it was not adherent to the moist, or granulating surface.

Method of applying adhesive plaster to burned surface.

This adhesive dressing prevents exuberant granulations and, as he says, "allows a continuous growth of epithelium from the margins." This mechanical effect is an important one, as anyone who has had to control this condition knows. It does not adhere to the exposed surface, which is moist; it can be removed with little injury to new tissues, bleeding rarely occurring. It prevents tissues growing into the gauze mesh.

# Clinical Uses for Adhesive Plaster

Fig. 1 Fig. 2 Fig. 3 Fig. 4

Fig. 1.—Reinforced strapping for sprain of wrist.

Fig. 2—Reinforced strapping for sprain of wrist. First layer consists of spiral form completely encircling wrist with moderate pressure.

Fig. 3—The reinforced straps are applied in a half figure of eight, crossing at the palm or dorsal surface according to seat of pain.—F. R. Cook, M.D.

Fig. 4—Reinforced adhesive plaster strapping of the carpometacarpal and metacarpophalangeal articulation of thumb. First layer passing around the thumb over the hand to the starting point.

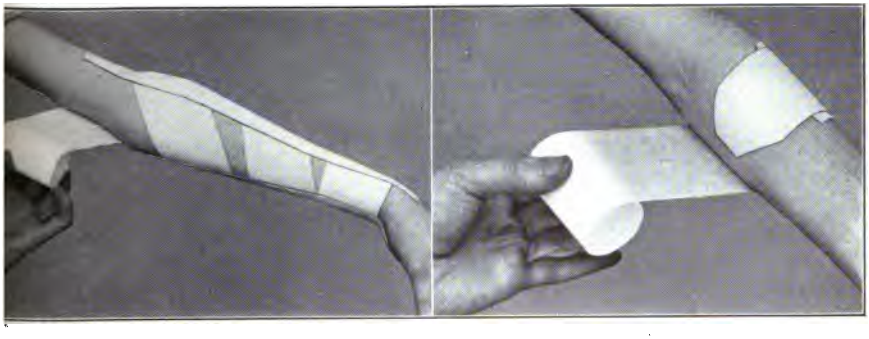


Fig. 5 Fig. 6

Method of applying gauze bandages to prevent slipping.

Fig. 5—Fix a roller bandage with three turns at the wrist; make turns until elbow is reached. Apply three adhesive strips ½ inch wide and to extend one inch beyond proximal and distal turns to the exterior or dorsal region of arm and apply gauze over it.

Fig. 6—Fasten gauze to piece of Z O Adhesive Plaster to apply to skin surface at starting point.

## ADHESIVES IN THERAPY

### From the Practitioner's Standpoint, Dr. Powell Refers to Many Diseases That Are Invariably Benefited by Appropriate Adhesive Strappings.

[Abstract of paper by C. H. Powell, A. M., M.D.]

The profession is now awake to the fact that disuse of many of the older remedies has been ill-advised. It has been commented upon that blood-letting is now neglected in disease when its apparent utility in years past was paramount to every other consideration; gelsemium is often relied upon to produce results which bleeding would more surely control, and the life of the patient be spared in certain full-blooded subjects attacked with pneumonia.

Blood-letting is often also withheld from women the subjects of amenorrhoea, who monthly experience violent paroxysms of pain and hystero-neurosis, who could be most promptly relieved by the extraction of blood. The same may be said of the other conditions referred to.

Prior to the advent of Listerism and aseptic surgery, adhesive plasters were in very common use as remedial agents, but in the exhilarating onward rush of the wonderful results achieved by the devotees of the new school with its far-reaching benefits to mankind, the tendency arose to eliminate whatever was deemed a possible carrier of germ life, and inasmuch as the adhesive properties of a plaster were believed to harbor possible hostile bacteria these useful agents fell into a most unmerited disuse.

During the period of evolution, however, adhesive plasters, unlike many other remedies, were appropriately returned to the high place in therapy their excellence entitled them to occupy, and at the present day there is no physician or surgeon whose satchel does not contain adhesive plaster of some make or size. There are many conditions in which the surgeon relies upon adhesive plaster, and I will refer generally to corns, bunions, swellings, mammitis, mammary abscess, inflamed joints, synovitis, ecchymosis, varicose veins, ulcers (in connection with antiseptics), frost bites, adenoids, boils, carbuncles, and dozens of conditions unnecessary to mention.

From a surgical standpoint the utility of adhesive plaster is generally recognized and it is universally employed, but from the standpoint of the general practitioner its advantages are often lost sight of, and reliance placed upon drugs that although in the main useful would often prove doubly so with the application to the affected part of some form of adhesive strapping.

From the practitioner's standpoint I wish to refer to the following diseases that are invariably benefited by appropriate adhesive strapping: Orchitis, epididymitis, pulmonary, hepatic, renal and throat diseases, mastitis, inflamed joints from gout or rheumatism, pleural involvement, hiccough, neuralgia, mouth breathing, lumbago, gastroptosis, enteroptosis, floating kidney, excessive sweating, tuberculosis, and in a long line of dermatological affections, as acne, comedones, eczemas, tinea circinata, lupus erythematosus, etc.

---

—In using Adhesive Plasters, in order to secure and maintain the greatest possible degree of adhesiveness, it is imperative to see that the skin is perfectly dry, free from greasy substances and from any kind of dusting powder.

---

—For three thousand years cotton has been used for covering wounds, but somewhere in the beginning of antisepsis cotton fibers were made absorbent—an improvement that will remain until the end of time.

# Clinical Uses for Adhesive Plaster

Fig. 1 Fig. 2 Fig. 3 Fig. 4

Fig. 1—Sayre's dressing for fracture of clavicle. Two straps of adhesive plaster three inches wide and long enough to reach one and one-half times around the body—one strap encircles the arm below axilla and is carried around the back and across the chest. The other strap goes from the hand on the chest to the scapula.

Fig. 2—Stimson's dressing for dislocation of the outer third of the clavicle. Three-inch plaster is used.

Figs. 3 and 4—Dr. Bellamy's dressing for fracture of the clavicle. Strap with claw pattern ends holding shoulder backward and upward. Pad of cotton and gauze to act as fulcrum for strap. Strap encircling elbow and elevating shoulder. Fixation strap holding arm in position.

Fig. 5 Fig. 6 Fig. 7 Fig. 8

Fig. 5—Z O Adhesive Plaster dressing for fracture of ribs. Partial strapping beginning with lower two-inch strap, a little beyond the median line; one strip overlapping the other and extending over the median line in back.

Fig. 6—Complete encircling adhesive plaster dressing.

Fig. 7—Spiral dressing.

Fig. 8—Dressing for fracture of sternum. Two-inch Z O Adhesive strips to encircle chest with one reinforcing strap crossed in front at site of fracture.

## THE REMOVAL OF WRINKLES

An important use has been found for Z O Adhesive Plaster as a toilet accessory. Acting upon the suggestion of a very famous surgeon, the beauty doctors have proclaimed the fact that the use of adhesive plaster is one sure mode for the removal of wrinkles and for the

Method of treating wrinkles about the eyes.

clearing and beautifying of the complexion.

The technique of this use is very simple. Before retiring, the wrinkled skin is drawn tense with the first and second fingers of the left hand, while

Method of treating wrinkles at mouth.

the plaster in narrow strips is applied over the surface parallel with the wrinkles. It is immaterial whether a wide or narrow strip is used except for convenience in treating wrinkles at the

Method of treating wrinkles on chin.

angles of the eye, between the eyes, etc. The plaster is allowed to remain until the following morning.

Unless the wrinkle to be obliterated is a very deep one, it is never necessary to apply more than one layer of the plaster at a time. To remove the plaster from the face daub lightly with a piece of cotton dipped in grain alcohol.

---

## ACTION OF RADIUM RAYS

The emanations of radium paralyze many molds, stop the growth of the mycelium and prevent the germination of spores. They are not killed, but are in a latent state, and will germinate when replaced under normal conditions. The ferments or enzymes in most instances are rapidly destroyed by radium emanations. Emulsin, tyrosin, pepsin, pancreatin and ptyalin quickly lose their activity under the action of the rays, but rennin is resistant.

The radium emanations produce hydrogen peroxide; in water the ferments are immune to, but more active, in the presence of this substance produced under these conditions.

---

—The 125 pages of the Physicians' Descriptive Catalog contain terse descriptions and accurate illustrations of the principal J&J products. Send for it.

# Clinical Uses for Adhesive Plaster

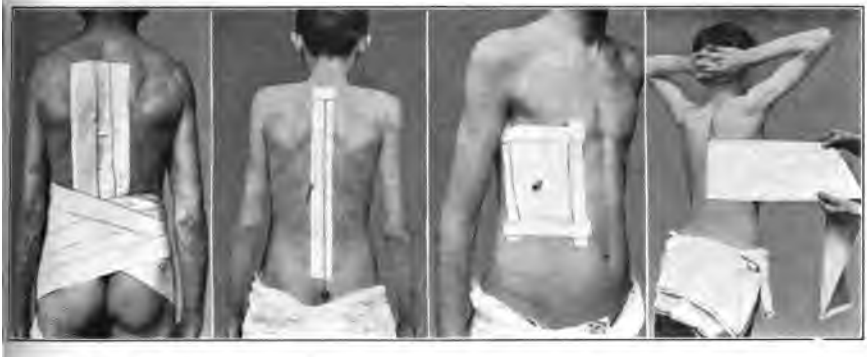


Fig. 1 Fig. 2 Fig. 3 Fig. 4

Fig. 1—Strapping for neurasthenic or rheumatic spine. Dressing allowed to remain a week or more.

Fig. 2—Adhesive plaster strip for determining curvature of the spine. Strip is pasted along vertebræ prominences and over this a plumb line is held in place by a strip of plaster on top.

Fig. 3—Dr. Charles M. Brucker's dressing for empyema. Dressing of gauze, cotton, etc., held in place with Z O plaster strips.

Fig. 4—Adhesive plaster swathe for fracture of rib. Initial end fixed at the spine, held

Fig. 5 Fig. 6 Fig. 7 Fig. 8

taut and to go three-quarters around the body. Plaster wide enough to extend six inches on either side of fracture.

Fig. 5—Strapping for fracture of the clavicle by Dr. Frank Romer in London Lancet.

Fig. 6—Supportive strapping in mastitis. Two straps two inches wide.

Fig. 7—Strapping for the maintenance of dressing and for giving support to the inflamed breast.

Fig. 8—Compression dressing. Straps to extend a little over the median line in the back.

## NEW SUTURES

To meet the demand for certain special forms of sutures, Johnson & Johnson have made additions to their list of ligatures, as noted below. The sutures noted in this list are on sale at drug stores and physicians' supply houses. The reports received from operators who are using them are to the effect that they are timely, satisfactory and very convenient, obviating the necessity of the surgeon attempting to prepare these forms of sutures for himself. These sutures are of such a nature that samples cannot be supplied.

### BLOOD-VESSEL SUTURES

Prepared according to directions of Dr. B. M. Bernheim, Baltimore, Md., for suturing blood-vessels.

Very fine black silk in a very fine, straight, round needle, put up in and sterilized in liquid vaseline in tubes.

Packed three tubes in a box.

### INTESTINAL SUTURES

A straight, fine needle threaded with black silk in such a way that there is no doubling of the silk through the eye of the needle. The silk is twisted after threading through the eye. One yard of silk in each tube.

Each tube packed in an individual box.

### CIRCUMCISION SUTURES

A regular full-curved No. 14 needle threaded with 30 inches of No. 0 plain catgut put up in a tube.

Each tube packed in an individual box and one dozen of these in an outside box.

### OBSTETRICAL SUTURES

A regular full-curved No. 4 needle threaded with 36 inches of No. 3 extra-hard chromic catgut put up in a tube. Each tube packed in an individual box.

---

—An animal lives five times as long as it takes to complete development of its skeleton.

## NEW SYNOL SOAP BOTTLE

The glass container of Synol Soap has been improved by making four finger depressions on each side of the bottle. This change enables the user to obtain

a firm grip upon the bottle, even with wet and soapy hands, and removes any possibility of the bottle slipping from his grasp. The fingers naturally fit into the grooved spaces. This improvement to the sprinkler top bottle, we believe, makes a perfect container.

---

—Whenever possible, adhesive plaster dressings should be covered with a neat gauze bandage. This helps to retain the dressing in position when first applied; it keeps it neat and clean, increases its adhesiveness and prevents it sticking to clothing or bed linen.

# Clinical Uses for Adhesive Plaster

Fig. 1 Fig. 2 Fig. 3

Fig. 1—Spiral adhesive plaster dressing for injury in the lateral ligaments.

Fig. 2—Strapping of the knee for sprains, inflammatory processes, rheumatic pains. Adhesive straps 1½ inches wide to encircle knee, each strap slightly overlapping the other and crossed on the exterior surface in a half figure of eight.

Fig. 3—Strapping over a compression dressing for inflammatory affections of the joint, requiring rest as well as medication. After dressing is applied all is covered with cotton and gauze strapped over with Z O strips.

## IODINE AND BELLADONNA PLASTER

At the request of a number of specialists who give attention to skin troubles, etc., where the application of iodine and belladonna has been found useful, Johnson & Johnson have prepared a small amount of Iodine and Belladonna Plasters. These plasters contain the U. S. P. amount of belladonna compound with about 5 per cent of iodine. They have not been placed upon the market and may not be, but as some of the lot remains on hand, Johnson & Johnson will be pleased to send a sample of this plaster to those who may be interested, on application.

If the reports of the use of such an application should be found favorable, Johnson & Johnson will take into consideration the advisability of placing the plaster upon the market. At present only samples can be obtained direct from the manufacturers.

---

—The doctor's soap—Synol.

## HOW TO USE ADHESIVES

**Suggestions As to Maintaining the Greatest Possible Degree of Adhesiveness and for Applying and Removing the Adhesive Plaster Dressing.**

In using adhesive plasters, in order to secure and maintain the greatest possible degree of adhesiveness, it is imperative to see that the skin is perfectly dry, free from greasy substances or from any sort of dusting powder.

Before the plaster is applied to a hairy part, the hair should be carefully shaved off. If the hairy part to be covered is of limited extent, while long strips of plaster are to be used, that part may be covered with gauze where the plaster passes over it.

If a rubber adhesive dressing is to be made with strips over an unequal surface, it is a general rule that the narrower it is practicable to make the strips the neater and closer fitting will be the dressing.

In unrolling and cutting strips from a spool, before applying, it will often be found that some are a little too long, while others may be too short, resulting in a certain amount of waste.

It will often prove very convenient and economical to pull a few inches off the spool, and to apply this free end to the surface to be covered, keeping it in place with one hand while the spool is gradually unwound to the desired length with the other. The plaster can then be cut off at the exact length desired, and the process repeated. This will save plaster and obviate any annoyance caused by the tendency of long ends to catch and stick to everything around.

In using large strips from the sheets of plaster, as, for instance, for dressing broken ribs, it is advantageous at first only partially to remove the protecting cloth, applying first the free end and then removing the cloth gradually as it becomes necessary. This will really save a good deal of annoyance.

In applying adhesive plaster to an extremity, it must be remembered that the part will necessarily be constricted to some extent. This must be guarded against by bandaging the fingers from tips upwards, by maintaining the limb in an elevated position, or by dividing the dressing in a line parallel with the long axis of the limb.

Whenever it is possible, adhesive plaster dressings should be covered by a neat gauze bandage. This helps to retain the plaster in position when first applied, keeps it neat and clean, increases its adhesiveness, and prevents any sticking to clothing or bed linen.

The removal of adhesive plaster is usually accomplished by a rapid motion. Ether, gasoline or benzine are used to remove particles adhering to the hair. Adhesive plaster may be removed easily and painlessly with the simple procedure of saturating a sponge or dab of absorbent cotton with alcohol, then applying the alcohol between the loosened edge of plaster and the skin.

## IN THE WAKE OF THE WAR IN HUNGARY

Dr. Charles MacDonald, who worked under the Marine and Red Cross authorities in Hungary, has made an interesting report, in the course of which he describes the labors and duties of the American surgeons and nurses and pays a high tribute to their ability and zeal. He states that a complete system was established covering the care of the sick and wounded, which enabled them to work rapidly and efficiently. He states that the work was often offensive in many ways—cases infected, dirty and covered with vermin were in abundance

# Clinical Uses for Adhesive Plaster

Fig. 1 Fig. 2 Fig. 3

Fig. 1—Adhesive plaster dressing for retaining umbilical hernia in infants.—Dr. John S. Garrison.

Fig. 2—Dressing for umbilical cord. The gauze nearest skin covering cord should have a central hole through which stump is drawn, gauze being then folded over.—Dr. Samuel C. Benedict.

Fig. 3—Z O Adhesive Plaster application in gastric neurasthenia, movable kidney, gastro-enteroptosis, etc. This dressing is applied with parallel strips running from the median line in front to the median line behind, just as we would apply a dressing for fractured ribs, except that we begin just above the crest of the ilium and extend it well up on the ribs.

and with the usual disease of the soldier in addition to actual wounds. The following is extracted from his report:

"The usual diseases which follow armies are frequent. Cholera, typhus, tetanus, typhoid fever, dysentery and the various gastroenteric conditions, tuberculosis, mental and nervous diseases are numerous and the conditions as to cleanliness are poor.

"All wounds are highly interesting, shrapnel leading in frequence. The rifle ball of the modern war is humane and rarely fatal. There are few sabre cuts and bayonet wounds; fractures of all kinds are observed, many of them of the compound variety. All open wounds are infected with gas or gangrene infection; the mortality in these cases is very high.

"Typhus will follow the armies and cause great havoc as long as the louse has the freedom of traffic. Cleanliness will do much to suppress typhus.

"Vermin and cold in winter cause the greatest suffering, while in summer, lice and heat are the largest factors.

"The question of the transportation of the wounded is one of great interest and importance.

"The first dressing is extremely important and the man himself or his comrades should know how to apply it. It means the saving of life. Thousands of men come back from the lines with very slight wounds. They should be kept at the front to avoid congested traffic. They can be treated successfully and kept on the line if told to do so. It is very important to have the men care for each other on the firing line, as surgeons and hospital corps men should not be sacrificed at the front as they have been in Europe. Hospital and first aid methods should be practiced on a large scale. Feeding and rest quickly work wonders with sick and wounded soldiers.

"In treating wounds the free use of iodine, free drainage, comfortable dressings, light splints and mechanical apparatus for fractures produce fine results. The cardinal points to be considered are: Receiving rooms, baths, disinfection and care of clothing. Sterile technique in these cases means much lost time."

## THE CHIEF HAS FALLEN

Dr. John B. Murphy, of Chicago, one of the leaders among the American surgeons and known in his profession throughout the entire world, died suddenly at Chicago on August 11, 1916.

In the language of Dr. Charles H. Mayo, President of the American Medical Association, "The medical world has

The late Dr. Murphy.

sustained a great loss in the passing of Dr. Murphy. In him were combined industry and inventive genius, with a surpassing amount of general information. He possessed that rare faculty of stimulating thought as well as of imparting knowledge, and he was the greatest surgical teacher of his time. He will live in history as one of the great leaders of modern medicine."

He was world renowned, a pathfinder, an experimenter in many departments of surgery. No man living or of the recent past has contributed more to his science than Dr. Murphy. He died a martyr to his profession—the result of pain.

Readers of these pages are undoubtedly most familiar with him through the now celebrated "Murphy Button" and his collaboration in connection with the Johnson & Johnson Laboratories in producing "Murphy's Adhesive Dam."

As stated by one of his spiritual advisers, "The world has lost one of its greatest surgeons and one of its most useful and helpful men."

## DOSAGE OF BACTERINS

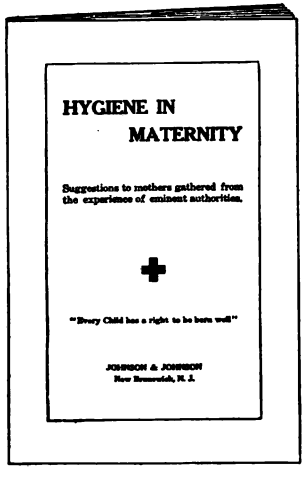
The size of a dose of a given bacterin, like that of a drug, depends upon a number of factors, such as age, sex, body-weight, idiosyncracy, and so on, says W. C. Wolverton, M. D., in *Clinical Medicine*. But, in general, the adult dosage of the bacterins in common use by me is about as follows:

Staphylococcus pyogenes albus—100 millions to 1000 millions.
Staphylococcus pyogenes aureus—100 millions to 1000 millions.
Streptococcus pyogenes—30 millions to 100 millions.
Streptococcus erysipelatis—50 millions (daily).
Streptococcus virians and s. rheumaticus—50 millions to 500 millions.
Pneumococcus—20 millions to 100 millions.
Gonococcus—100 millions to 1000 millions.
Micrococcus catarrhalis—25 millions to 100 millions.
Bacillus coli communis (colon-bacillus)—20 millions to 200 millions.
Bacillus typhosus (typhoid-bacillus) (immunizing)—500 millions to 1000 millions.
Bacillus typhosus (typhoid-bacillus) (therapeutic)—100 millions to 500 millions.
Bacillus influenzæ—50 millions to 200 millions.
Bacillus pertusis (Bordet's bacillus)—50 millions to 500 millions.
Bacillus of acne—10 millions to 100 millions.
Bacillus of Friedlander—75 millions to 300 millions.
Meningococcus (immunizing)—500 millions to 1000 millions.
Bacillus tuberculosis (non-virulent)—100 millions to 1000 millions.

## FOR EXPECTANT MOTHERS

It is of advantage for physicians with considerable obstetrical practice to supply their patients with printed instructions in plain language concerning the diet, dress, rest, exercise, baths and other matters connected with the hygiene of pregnancy.

To supply this need, Johnson & John-


HYGIENE IN
MATERNITY
Suggestions to mothers gathered from the experience of eminent authorities.
"Every Child has a right to be born well"
JOHNSON & JOHNSON
New Brunswick, N. J.

son have published "Hygiene in Maternity," a 48-page booklet. Compiled from the chief authorities, it contains all of the information which the physician would wish his patient to have.

"Hygiene in Maternity" is in no way intended to supersede the advice of the physician. It forms a welcome and necessary adjunct to his services. It is quite natural, therefore, that so many physicians have secured copies of this book—which is sent for the asking—and have given copies of it to all expectant mothers on their list.

One or more copies of this book will be sent, postpaid, on request, to any physician. Address Johnson & Johnson, New Brunswick, N. J.

## BORALUM GAUZE

Johnson & Johnson announce the preparation of a new form of antiseptic gauze, prepared by impregnating absorbent gauze with a specially prepared solution of boroglyceride and aluminum acetate.

This gauze has the well-known antiseptic properties of boroglyceride and aluminum acetate, and will undoubtedly find a large variety of uses, both in surgical and in medical practice.

Boralum Gauze will act as a mild astringent, exsiccant and hemostatic. A dressing of this character has been largely used as an application to fresh wounds, especially lacerated wounds; as a dressing for infected wounds, for burns, for old sores, ulcers, especially for bed sores, and as an absorbent and deodorant for purulent discharges. A dressing of this character has also been found useful as an application in inflamed conditions, as well as in diseases of the skin.

Boralum Gauze will undoubtedly be found useful as an excellent first aid dressing, especially adapted for use by the laity. The gauze may be applied dry. When dipped in water it forms an efficient substitute for the well-known acetate of lead solution, with the added value of boroglyceride.

Boralum Gauze is put in the following forms:

Yard and Five-Yard Rolls—in cardboard containers.

One-Yard and Five-Yard—glass jars —Linton.

---

—Cotton fiber requires special selection and treatment to render it suitable for surgical use. It is evident that the so-called absorbent cotton from cotton mills is prepared without any regard or knowledge of the requirements of modern surgery.

## PERFORATED ADHESIVE

Dr. George G. Shoemaker, of Carnegie, Pa., makes the following suggestion:

"In my private practice and as attending surgeon to the Out Patient Department of the Pittsburgh Homeopathic Hospital, I have a great many cases of fractured ribs, fractured clavicles, etc., to treat.

"Invariably these cases develop a dermatitis due to the adhesive, although I always change same at least every seven days.

"I have proven to my own satisfaction that a perforated adhesive is just as reliable and does away with the dermatitis, which is very annoying to the patient.

"If you think this suggestion of any value you are welcome to it, and I know if you will put a perforated adhesive on the market it will be welcomed by the physicians throughout the country."

## GRENFELL ASSOCIATION

The International Grenfell Association writes from its registered office, King George the Fifth Seamen's Institute, St. John's, Newfoundland:

Messrs. JOHNSON & JOHNSON,
New Brunswick, N. J., U. S. A.

Gentlemen:—We acknowledge with thanks receipt of ten copies of—

Hygiene in Maternity,
Contagious Disease Bulletins,
Handbook of Ligatures,
Adhesive Plaster in Modern Surgery,

which we have sent to the medical officers in charge of our hospital stations.

Faithfully yours,
THE INTERNATIONAL GRENFELL ASS'N.

## THE DOCTOR'S BEARD

The beard of a doctor goes wherever there is disease. However, we say nothing about it, because we do not want to hurt any good doctor's feelings. If it were not for that, we should advocate a law compelling all doctors to be smooth shaven, or at least to stop after each visit to a patient and have their beards washed with a mild solution of carbolic acid and alcohol.

We observe that in the hospitals doctors compel female nurses to wear nice little caps to cover up their hair—this is to keep the germs from spreading. If it were not for our great respect for doctors, we should advocate a law compelling them to wear nice little caps on their beards in active service, unless they consented to shave or to disinfect with carbolic acid.—*New York American.*

## SATISFACTION

"I thank you for your response to my recent inquiry regarding aseptic adhesive plaster and for your liberal samples," writes Dr. Charles A. Parker, of 7 West Madison Street, Chicago. "I suspected what you said about your regular rolls was the case, that they were practically free from wound-infecting organisms and therefore safe for the use to which I put them. However, it is a satisfaction to know of the strictly aseptic strips to satisfy the most scrupulous."

## THANK YOU

"I appreciate your Red Cross Notes and gain many valued points from it. It is my habit to specify J & J on prescriptions for articles such as you make."—Dr. John M. Lee, Indianapolis, Ind.

"The Red Cross Notes of Johnson & Johnson is the one piece of advertising literature that comes to my office that I always have time to read. I read it with real pleasure and it is time both pleasantly and profitably spent."—Dr. Forest A. Carpenter, Statesville, N. C.

## BUYING FOR HOSPITALS

Economical management of hospitals does not necessarily mean the buying of cheap things for their maintenance. Five or six years ago a hospital was built by a board of trustees composed of business men. They took the stand that hospitals were costing entirely too much, and contended that a splendid hospital could be built for twenty cents per cubic foot, which was the cost of a good factory building which the head of the board had recently completed.

A good deal of ornamentation was put on the front of the building, and the "show places" were accentuated in the architecture, but the hospital was completed at a remarkably low price. The board of trustees were held up as examples of what a disinterested group of successful business men could do by using business judgment.

Before two years were past the hospital looked fifteen years old, and repairs, alterations and renewals were monthly features in the balance sheet. To-day the plumbing has become all but useless; the veneer is bulged and split on nearly every door; the floors are a disgrace and, of course, the paint all over the house was gone long ago and replaced by the same board with equally cheap stuff which, in its turn, has been washed and worn off.

If that board of "business men" had put in good material in the first place, their hospital would have run along practically without repairs or renewals for several years, and for ten or fifteen years the upkeep should have been negligible.

Then in regard to medical and surgical supplies and foods: poor instruments, badly made; cheap syringes, water bottles and rubber goods; shopworn, vulcanized rubber gloves; large mesh, lightweight gauze; short fiber cotton poorly absorbent; there is enough waste on all these commodities to more than pay for good materials—to say nothing about the inconveniences due to accidents in the use of poor stuff.

So, taking the whole problem, and from any viewpoint, there is no money to be made buying cheap products, and everything to be gained by buying the best of its kind.—*Selected.*

## AN OLD-TIME REMEDY

Dr. A. L. Gardner, of Painesville, Ohio, states that he has used successfully what he terms "an old-fashioned remedy" in cases of open wounds and even in traumatic tetanus, in the latter sometimes after convulsions had set in. The method of use is to put the soap down to the bottom of the wound and immediately apply a hot poultice.

He states that relief will be experienced in an hour and all symptoms will rapidly disappear. The doctor states that he has used this invariably during his professional life of forty-seven years and always with satisfactory results.

One of the difficulties which he experiences is to obtain the old-fashioned home-made soft-soap, but it is suggested that the modern green soap will perhaps fill the bill.

---

## CAN'T WORK WITHOUT SYNOL

"I feel I cannot work without Synol Soap, having used it faithfully in public and private practice for the past fifteen years," writes Mrs. Ella C. Gleason, registered nurse, of 102 Lincoln Street, Flushing, N. Y. "I started using it while doing Board of Health work, visiting contagious diseases. I never carried any of the contagious diseases into my own home, because I always used plenty of Synol Soap after handling these cases. I am still using it for surgical work, among the sick and poor when doing my rounds as district nurse, and advise its use among intelligent patients."

---

## A GREAT ASSISTANCE

Dr. Anna T. Dunn Roe, State Medical Examiner of the Ladies' Auxiliary, Ancient Order Hibernians in America, of Detroit, Michigan, writes:

"I have a small paper-covered book, "Hygiene in Maternity," which was published by you. I consider it of great assistance to nurses and I myself have considered it quite helpful to me in obstetric cases. I lecture to a class of nurses at Providence Hospital, Detroit, Mich. It numbers fourteen. They will graduate this year. My subject is Obstetrics."

---

—Synol Soap sterilizes the skin.

# Forms of Adhesive Plaster

## Made by Johnson & Johnson

### Surgeon's Rubber Adhesive Plaster

**(Yellow Mass)**

This is the rubber adhesive plaster as originally made by Johnson & Johnson. This plaster is sometimes designated as India-rubber Plaster or Surgeon's Rubber Adhesive Plaster, but it has to a great extent been supplanted by our Z O Adhesive Plaster described below.

**On Strong Cotton Cloth**

1 Yard Rolls, 7 in. wide.....Plain or porous
5 Yard Rolls, 7 in. wide.....Plain or porous
5 Yard Rolls, 12 in. wide.....Plain only

**On Moleskin**

1 Yard Rolls, 7 in. wide.....Plain only
5 Yard Rolls, 7 in. wide.....Plain only

**On Spools (Packed in Cartons) Plain Only**

Five Yards Long in following widths: ½, 1, 1½, 2, 2½, 3 in.
Ten Yards Long in following widths: ¼, ½, 1, 1½, 2, 2½, 3, 4 in.

### Z O Adhesive Plaster

**(White Mass)**

Z O Adhesive Plaster represents a progressive step in the art of plaster making. All foreign and irritating substances are removed by careful grinding and washing, by neutralizing the acids and by evaporating the turpentine and volatile products. Further operations of preparing and spreading the mass are performed at the lowest possible temperature, as great danger accompanies the use of heat. These factors determine the adhesiveness and efficiency of the plaster as a surgical appliance.

In modern surgery the Z O Adhesive Plaster finds many uses, and on account of its cleanliness, convenience and freedom from irritating qualities, has been pronounced by all who have tried it to be most suitable of all adhesive plasters for general surgical purposes.

**On J&J Improved Face Cloth**

1 Yard Rolls, 7 in. wide.....Plain or porous
5 Yard Rolls, 7 in. wide.....Plain or porous
5 Yard Rolls, 12 in. wide.....Plain only

**On J&J Spools, Plain Only**

2½ Yards, ½, 1, 1½ in. wide.
5 Yards, ½, 1, 1½, 2, 2½, 3, 4 in. wide.
10 Yards, ¼, ½, 1, 1½, 2, 2½, 3, 4 in. wide.

### Z O Aseptic Adhesive Strips

As the ordinary forms of adhesive plaster are liable to infection in handling, the Z O Aseptic Strips are cut into suitable widths, enclosed in double envelopes, sterilized within the envelopes and sealed to prevent infection.

10 in. long, ¼ in. wide.....12 strips in each envelope
10 in. long, ½ in. wide..... 8 strips in each envelope
10 in. long, 1 in. wide..... 4 strips in each envelope

## Rose's Adhesive Plaster and Adhesive Belt

**On Moleskin, Not Porous**

These two forms of plaster were made to meet the requirements of Dr. Achilles Rose, as outlined in his work "Atonia Gastrica," etc.

| Sizes of Adhesive Plaster | Sizes of Adhesive Belt |
|---|---|
| 1-Yard Rolls, 7 in. wide | Large |
| 5-Yard Rolls, 7 in. wide | Medium |
| 5-Yard Rolls, 12 in. wide | Small |

## Z O Chiropodist Plaster

In narrow strips of ⅛ in. and ¼ in., 5 yards on 2-in. spool. Each spool in a box.

**Prepared Especially for Chiropodists**

## Z O Narrow Strips—Surgeons

In narrow strips of about ⅛ in., 5 yards on 2-in. spool. Each spool in a box.

The small, narrow strip of Z O Adhesive Plaster in this form has found a frequent use in surgery.

It will hold a small bandage in place. It will coapt facial wounds. Small incisions can be drawn together, making sewing unnecessary and preventing scars.

The narrow strip of Z O Plaster is very pliable, conforms to the contour of any part without wrinkling, and is non-irritating. It can also be used as a supportive dressing for a sprained finger, for holding small splints in place; in fact, hundreds of uses will suggest themselves in the daily work of the surgeon.

## Zonas Adhesive Plaster

Zonas Adhesive Plaster is supplied in two colors of mass, white and yellow. The white is preferred for wound dressing, the yellow for mechanical purposes; either is used for both purposes.

Rolled on Hollow Cylinders. Each cylinder in a decorated tin box

| | |
|---|---|
| 1-Yard Rolls | ½ in. wide |
| 1-Yard Rolls | 1 in. wide |
| 1-Yard Rolls | 1½ in. wide |

This is a most popular plaster among the laity, by reason of convenience and economy. It has largely supplanted the usual court plaster.

## De La Cour's Adhesive Plaster

**(Diachylon or Lead Base)**

For eighty years this plaster has been favorably known and used. Applied by heating.

**On Strong Cotton Cloth**

| | |
|---|---|
| 1-Yard Rolls | 7 in. wide |
| 5-Yard Rolls | 14 in. wide |
| 10-Yard Rolls | 14 in. wide |

**On Moleskin**

(Heavy Pliable Canton Flannel)

| | |
|---|---|
| 1-Yard Rolls | 6 in. wide |
| 5-Yard Rolls | 12 in. wide |

## Janus (Double-faced) Adhesive Plaster

This plaster is made especially for attaching wigs and toupees and for other mechanical purposes. It is made with white mass, Z O, on one side and yellow mass on reverse. The white side should be placed next to the skin.

| | |
|---|---|
| 5-Yard Roll | 7 in. wide |
| 1-Yard (in 3 pieces) | 7x12 in. |
| Strips | 1½x3½ in., 12 in a box |

## POLIOMYELITIS

### Pronounced Counter-Irritation, Produced by Canthos Plaster, Has Been Employed to Save the Spinal Cord and Help to Recovery in Infantile Paralysis.

The Medical World calls attention to the fact that in the pathology of anterior poliomyelitis it has been established that the infecting organisms select the spinal cord and the nerves emanating therefrom as the focal point of attack. The attack of the infecting organisms upon these nerves causes intense inflammation of the parts. A German physician some time since devised a course of treatment addressed to the relief of the intense inflammation of the cord and the nerves emanating from the anterior column and the cord which he recognized as the chief pathological condition present.

This treatment was nothing more or less than a blister applied over each side of the spinal column to which he added an application of a spice plaster over the abdomen. The purpose of this treatment is to create a pronounced counter-irritation and it was his experience that this saved the spinal cord and helped to recovery.

At the request of the Red Cross Notes, Mr. Kurrie W. Ostrom, an expert masseur, has placed suggestions for this treatment before our readers as follows:

The student of therapeutics finds that often old customs and theories now and then are rejuvenated. Amongst these we could mention cupping, leeching and blistering.

We shall here deal only with the last. When we wish to draw an inflammation to the surface we can do so readily, not only by internal drugs, but also by external application of medicaments that we know will produce a blister.

Long have we known that an inflammation of the middle ear, so very common during early molar dentition of children, is quickly relieved by a good size (about the size of a silver dollar) Canthos plaster over the whole mastoid process, but lately the attention of the profession has been called by the writer (see Medical World, September, 1916, et al.) to the great value of the use of the Canthos plaster in the early treatment of acute anterior poliomyelitis. The object here is to draw the inflammation, so intense as it is to frequently destroy the anterior motor portion of the cord, out to the surface, and in conjunction with a broad spice plaster covering the whole abdomen, produces a general and most effective counter-irritation. We use strips not less than an inch wide, one on each side of the spinal column, and have them long enough to be assured that the first nerve of the brachial plexus and the last nerve forming the sacral plexus are fully covered. If there be any trouble or special soreness in the cervical region proper, we of course cover it up above the atlas. In about two hours the Canthos plaster will painlessly produce a good blister, which afterwards is snipped at its lowest portion, to allow the serous fluid to be removed. The blisters, of course, are antiseptically covered. If in a great hurry to raise a blister, sponge the surface first with a little vinegar and water, and should any of the plaster stick wash it off with oil.

To make fully sure that the Canthos plaster will securely cover both the brachial and the sacral plexus, we make use of broad strips of adhesive plaster across the spinal column.

KURRE W. OSTROM.

---

—Chiropodist adhesive plaster strips, obtainable on spools, supply a neat and convenient means of fastening bandages of the fingers and toes—*American Journal of Surgery*.

---

—The most important requirement for absorbent cotton to be used in surgery is that it be surgically clean—free from germs.

---

—All physiological phenomena upon careful investigation appear to be but complex problems of a physical and chemical nature.

# The Germ Killing Power of Synol

THE primary aim in making Synol Soap was to produce a substance for the sterilization of the hands of the surgeons and nurses in the operating room. It has, however, been found adaptable to every use to which soap can be applied.

The United States Public Health and Marine Hospital Service has devised a precise method for standardizing disinfectants. Synol has been standardized under this method.

Under strict laboratory tests Synol, in diluted solution of from one per cent. to five per cent., kills resistant disease and wound producing organisms in from twenty to fifty seconds.

We will gladly send you a sample bottle to test for yourself.

# Lister's Formaldehyd Fumigator

FORMALDEHYD GAS is recognized by modern science as the most reliable and effective destroyer of disease germs and foul odors. Lister's Improved Fumigator is recommended as the most efficient, convenient and safe device for the production of formaldehyd gas. It generates the gas easily, diffuses it economically, and is free from the unpleasant dangers encountered in many other methods of producing gas.

Send for Circular No. 272. It tells how to use the Fumigator to kill odors and destroy disease germs. Sent free on request.

Scientific Department

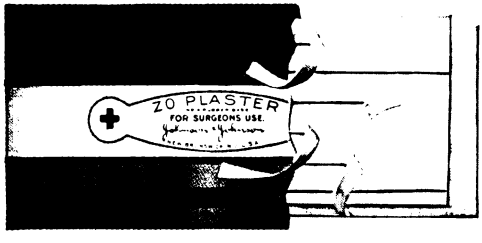
JOHNSON & JOHNSON

New Brunswick, N. J.

# Z O Adhesive—The Perfect Plaster

**Supplied in one and five yard rolls, 7 inches wide, and in five yard rolls, 12 inches wide, with improved facecloth.**

**These two forms of Adhesive Plaster supplied in five and ten yard lengths, ½, 1, 1½, 2, 2½, 3 and 4 inch widths.**




**Aseptic Adhesive Strips for wound closure. Ten yards long, ¼, ½ and 1 inch wide.**

**Z O Narrow Strips suitable for small operations.**

# Special War Issue

Series VII Number Eight

# RED CROSS NOTES

PUBLISHED BY
Johnson & Johnson
NEW BRUNSWICK, N. J., U. S. A.

Copyright 1917, Johnson & Johnson

DR. ALEXIS CARREL

The famous French surgeon who has devised a method of antiseptic irrigation of deep wounds that results in remarkably quick recoveries and, in most cases, without having any after-effects

## Surgery's Progress During the War

When the United States severed diplomatic relations with Germany Johnson & Johnson used the mammoth electric sign at their laboratories at New Brunswick, N. J., to preach loyalty. The usual advertising features were eliminated from the sign and every night for months it blazed forth with "Loyalty to America" in letters five feet high, just above an electrically waving flag. The sign, about one hundred feet long, nightly awakened the patriotism and enthusiasm of the hundreds of thousands of people who travel on the Pennsylvania Railroad between New York and Philadelphia. The camera man trained his apparatus on the electric display with the above result.

## War and Its Call to Service

America's entrance into the war is a call to service to every physician and surgeon in the country. There is patriotic work to do at home as well as in the army and navy.

The public must be taught that typhoid fever, dysentery and smallpox always prevail extensively in time of war unless unusual precautions are taken to protect the health. The warning must be sounded that war means a food shortage and that beri-beri, pellagra and scurvy are diseases associated with a deficiency of nutrition.

Municipalities must be taught health and sanitation preparedness and the medical profession must take the leadership in such work.

Surgery, called upon to perform heroic service, will have the advantage of experience gained upon the European battlefields, where wonderful advance has been made during the past two years. Some of these achievements are described in this issue of the Notes.

Johnson & Johnson have answered the call to service by placing their laboratories at the disposal of the Government and our large manufacturing equipment will be taxed to its fullest capacity for a long time to come. Loyalty and patriotism demand that we shall perform our full share of the Government work and our obligations to our customers, to whom we owe our success, demand that we take care of their normal and legitimate requirements.

The task of furnishing a vast quantity of supplies to the Government and of keeping our regular customers supplied is going to be a serious problem, but we know we shall have the loyal cooperation of our customers and we are meeting the situation with all the energy we possess.

# The Birth of a New Era in Surgery

## The Carrel-Dakin Method of Antiseptic Irrigation of Deep Wounds, Born of the Exigencies of the Great War, Makes the Surgeon Master of Infection—No Longer Will Amputation Be a Matter for Instant Decision

When Dr. Alexis Carrel, at the outbreak of the European war, placed his services at the disposal of his native land —France—eighty per cent of the amputations in the French military hospitals were due to infection and twenty per cent to destruction of tissue. He, in common with all the surgeons of the French army, realized that the greatest surgical need of the hour was a method of better sterilization of wounds.

Out of that need came the Carrel-Dakin method of antiseptic irrigation of deep wounds, the success of which in France and this country inspires confidence that it will prevent almost all amputations due to infection. It gives the surgeon perfect control; makes him master of infection.

No longer will the surgeon be called upon to decide at once whether he shall run the risk of forfeiting his patient's life by delay, or cripple his patient for life by immediate amputation. By simply keeping the wound sterile the surgeon can safely keep it open until the flesh grows and fills out the wounded part and nature completes its process of healing.

The difficulty in effecting complete sterilization heretofore, surgeons admit, has been almost entirely on account of the inability to reach anything except the surface with the antiseptics.

"Dr. Carrel at the outset conceived the idea," writes one of the investigators of his method, "that just as one washes a sponge by repeated saturations and wringings, so should a wound be washed by some sort of a 'flushing' system that would send the antiseptic solution to every part of the wound, allow it to pick up, so to speak, the germs of infection, and then carry them away. It was such a system that Dr. Carrel set himself to perfect."

Mme. Carrel flushing a wound, according to the technique devised by her husband, with the Carrel-Dakin solution. This photograph was taken at a French hospital.

Such foremost surgeons as Dr. Wm. O'Neill Sherman, chief surgeon of the Carnegie Steel Co., at Pittsburgh, Pa., and Dr. H. H. M. Lyle, professor of Clinical Surgery of the College of Physicians and Surgeons of Columbia University, who were privileged to witness the results obtained by this method of wound sterilization in the French hospitals, have been the leaders in informing American surgery of the new technique. Several American hospitals are now using the method with success.

The condition which confronted Dr.

ALMOST READY TO LEAVE THE HOSPITAL

The Carrel-Dakin method enables the surgeon to figure the exact date on which a patient can leave the hospital, so that arrangements can be made ahead to have his place filled by another waiting wounded soldier.

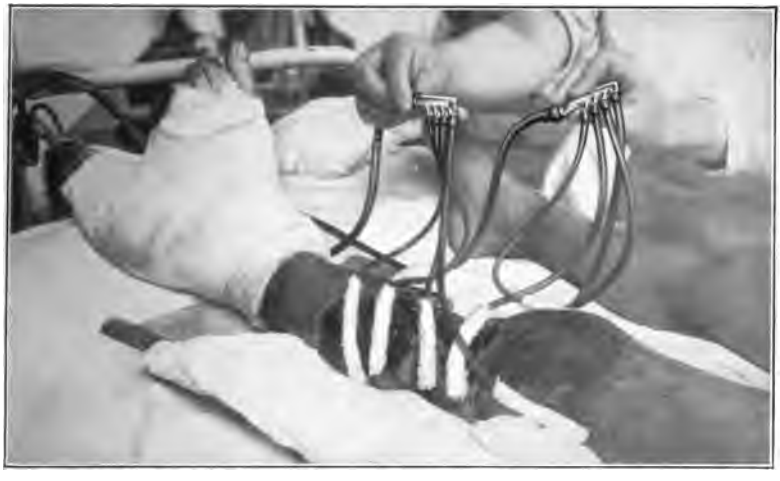
Carrel when he established his research laboratory at Compiegne, Oise, France, during the winter of 1914-15, was that all wounds produced by shells, torpedoes, grenades, etc., were infected and that the methods of handling these cases were powerless to prevent gas gangrene, septicæmia and chronic suppuration. His problem was to improve this condition.

Sir Almoth Wright, Colonel Grey and Professor Rutherford Morrison and others had formulated methods and treatments, but Carrel found them uncertain and unsatisfactory. He recognized the necessity for a specific, or a technique which would abort infection and control suppuration and which could be standardized throughout the military hospitals.

He called upon Henry D. Dakin, the great English chemist, now of New York, to produce a sterilizing solution while he devoted himself to the perfection of an apparatus for applying this solution. The result is what is known today as the Carrel-Dakin method of antiseptic irrigation of deep wounds, the possibility of which is summed up by Dr. Lyle in these words:

"I firmly believe that the adoption of this method is destined to save many lives, to reduce the gravity of the mutilations, and allow the rapid return to the front of many men who would otherwise be lost to the service of the country."

The new principle involved in this wound treatment is the gradual but complete sterilization of a wound by intermittent saturation of the dressing in contact with the injured surfaces by means of the Carrel-Dakin solution of sodium hypochlorite. The solution is carried from a reservoir to the site of the wound by means of a main rubber tube. From this tube it is carried into



When the soldier with this compound comminuted fracture of the leg arrived at the hospital he was labeled "Amputate on arrival." There was free suppuration on admission. The dressings had not been changed for five days previous. By the use of the Carrel-Dakin method the infection was under control in five days. The functional result secured was far superior to an artificial leg. The photograph shows Finochietto's stirrup extension to os calcis with Carrel's tubes in position. (Courtesy Professors Gosse and Chustro.)

the wound by smaller distributing tubes of rubber, the distal ends of which are perforated with fine holes.

Generally the perforated area of these tubes is wrapped with Turkish toweling or similar material to aid in thorough diffusion of the solution. Approximately every two hours the wound is saturated with the solution by releasing a screw pinch-cock which constricts the main rubber tube leading from the reservoir, which is usually hung on the head of the bed.

The proper regulation of the amount of solution is accomplished when the wound is completely saturated without flooding the bed. It is not a continuous irrigation process.

While not irritating to the underlying tissue, the solution is somewhat irritating to the skin, and it is therefore good technique to protect the skin surrounding the wound by applying to it strips of gauze saturated with ordinary petrolatum. These are laid upon the skin with their edges close to the edges of the wound.

The Carrel-Dakin solution itself is a solution of sodium hypochlorite made by adding sodium carbonate to calcium hypochlorite (chlorid of lime), but it differs from all previously used solutions of such character in the particulars that its chlorin content must be exact within given limits and that its caustic alkalinity must be completely neutralized by means of sodium bicarbonate.

The failure of all previously devised solutions of this character, Drs. Carrel and Dakin found, was due to the wide and constantly changing variations in the chlorin strength of calcium hypochlorite, and to the caustic soda contained in solutions made of it in combination with sodium carbonate.

The Carrel-Dakin solution is quite distinct from any chlorin solution previ-

ously known and should be strongly differentiated from chlorin solutions known as "Javelle Water," "Labarraque's Solution," "Chlorazene," etc. It is described as "an ideal isotonic and wound antiseptic of high disinfecting qualities with low toxic or irritating qualities."

In addition to being a strong wound and bactericidal solution because of its pyocytohemolytic powers it has the advantage of being able to dissolve pus, old blood clots, tissue debris, etc. The living tissues resist this dissolution owing to the protection afforded them by the sodium chlorid of the serum.

It is believed that the Carrel-Dakin method opens a new and hitherto unknown field to surgery. By means of this technique many amputations can be avoided and much suffering prevented. Uncertainty and doubt as to the best procedure on the part of the surgeon is removed. He need no longer be compelled to decide at once whether to amputate or run the risk of general infection or of gangrene. Serious compound fractures, infected joints or abscesses, for instance, may safely be treated by this method with entire assurance that the surgeon can produce a sterile wound and can maintain it in that condition indefinitely or until circumstances, in his opinion, warrant closure of the wound.

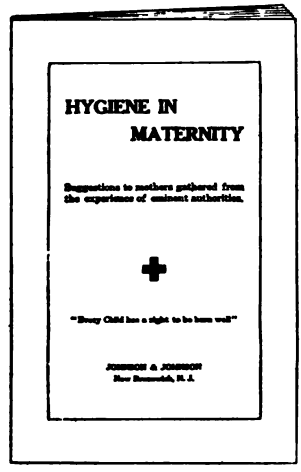
It is, therefore, believed that there is now at hand for the surgeon a new source of power.

## PAMPHLET ON CARREL METHODS

An eight-page illustrated pamphlet entitled "The Carrel-Dakin Method of Wound Sterilization" has been issued by the Scientific Department of Johnson & Johnson. A copy will be sent free to any physician interested in this subject upon request.

## HYGIENE IN MATERNITY

The forty-eight page book which bears the title of "Hygiene in Maternity" has proven a real help to physicians and nurses in maternity cases. It answers questions which the busy practitioner is not always on hand to answer. Many




physicians and nurses place it in the hands of expectant mothers. In its compilation the assistance of the best obstetrical authorities was secured.

Johnson & Johnson will send a copy to any physician or nurse requesting it and, if desired, will supply a quantity for distribution among obstetric patients. There is no charge for this service.

## POWER OF CAMPHENOL

A new eight-page booklet describing the medical and surgical uses and the germicidal power of Camphenol has been issued by the Scientific Department of Johnson & Johnson. Hospitals, physicians, health boards, and surgeons of various public institutions have tested Camphenol and have agreed to its value as a disinfectant. A copy of the booklet, which is No. 328, will be sent to any physician or nurse or hospital executive.

# Technique of the Carrel-Dakin Method

## The Methods for the Use of the Wound Sterilizing Solution Abridged from the Writings of Carrel, Sherman, Lyle and Others, with Special Reference to Military Practice—Johnson & Johnson Supply the Ingredients

For the accommodation of practitioners who desire to use the Carrel-Dakin method of wound sterilization the Johnson & Johnson Laboratories have worked out a method by which the ingredients are supplied in glass tubes. The tubes are supplied in pairs, marked A and B.

The contents of these two tubes, bearing the *same lot number,* when mixed and shaken up thoroughly for not less than fifteen minutes in the amount of water stated on label and filtered, will make the Carrel-Dakin solution, for wound treatment, of proper strength (.45% to .50% sodium hypochlorite), and free from caustic alkalinity.

The methods which here follow for the use of the Carrel-Dakin Solution have been abridged from the writings of Drs. Carrel, Sherman, Lyle, and others. For a more complete technique, see "Surgery, Gynecology and Obstetrics," for March, 1917, pp. 255-274; Journal A. M. A., January 13, 1917, pp. 107-110.

It is to be noted that the observations upon the use of this solution up to the present have, for the most part, been made with special reference to military practice, but many operators have now extended the use to civilian practice. The suggestions herein given may be easily adapted to meet conditions.

"In military practice the area surrounding the wound is disinfected with tincture of iodine, followed by an injection of the Carrel-Dakin solution in the wound if it is small or narrow; if it is wide and fairly open a gauze pack is saturated with the Carrel-Dakin solution and applied. At the civilian hospitals, if the wounds are extensive or conditions warrant, a general anesthetic is administered and the operating field prepared in the usual way.

"A free incision and thorough exploration for foreign bodies in all wounds should be made at the earliest possible opportunity. All bleeding points should be ligated; the shell tract should be freely opened and all devitalized tissue excised. The Carrel tubes should be carried to the bottom of the wound, and gauze placed loosely between them.

"The number of tubes to be used must be decided by the size and depth of the wound. They should be inserted so that all parts of the wound are constantly bathed with the solution. To prevent the tubes from bunching in the wound, strips of gauze are placed loosely between them. The gauze serves the double purpose of keeping the tubes in situ and retaining the solution. Gauze should never be packed tightly in the wound. A gauze compress is gently placed over the tubes and the dressing completed by covering with Turkish toweling. The dressing is fixed with a bandage, care being taken not to constrict the tubes, but fixing them to prevent displacement."

For superficial wounds the Carrel tubes are covered with Turkish toweling, extending from the distal end to a point just beyond the proximal perforation. These tubes remain in position without slipping over the tissues and keep the wound areas sufficiently bathed.

"The solution should be allowed to flow into the wound by releasing the stop-cock, allowing just sufficient solution to enter the wound to fill it and not

Double traumatic amputation of both legs below knee, extensive sloughing of tissues with infection. Suppuration disappeared completely in five days under the Carrel-Dakin method of treatment.

The same case with the Carrel tubes emerging from dressing attached to four-way glass distributor to which container of Carrel-Dakin Solution is attached. (Dr. Wm. O'Neill Sherman's case.)

overflow. The wounds are 'laked' or 'puddled' with the solution. Where pain is experienced the container should be lowered. The pain is due either to pressure or the causticity of the solution.

"Emphasis must be laid upon the fact that the most effective method is the intermittent instillation every two hours, day and night, and not constant irrigation. The amount of solution to be injected can be prescribed by the surgeon in charge. However, the attending nurses soon learn by experience just how much solution is necessary."

PROTECTION OF THE SKIN

In order to protect the skin from the liquid which may accumulate in the dependent portion of the dressing, gauze impregnated with yellow petrolatum is applied to the surface around the wound.

"Before completing the final dressing the solution can be injected into the wound to ascertain the amount of solution necessary to fill the cavity completely, and whether or not it is reaching all the parts."

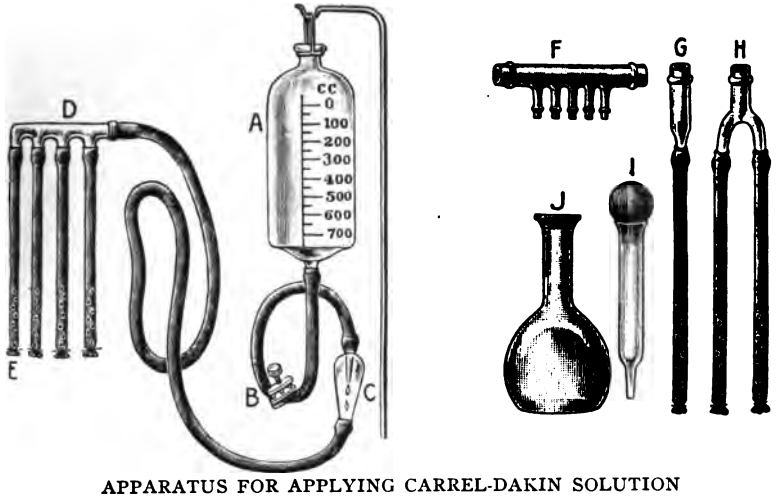
"The final dressing consists of a gauze pad saturated with the Carrel-Dakin solution, over which a large pad of non-absorbent cotton, completely enveloping the extremity, is placed. A Turkish towel can be used instead of non-absorbent gauze pads if desired."

"The wound should be re-dressed daily. In emergency cases, dressings can be delayed two or three days providing the instillation of the solution is kept up. It is absolutely necessary that a free and open incision be used, to permit the easy introduction of the tubes and gauze in the wound."

BACTERIAL CONTROL

"Bacteriological verification is a most valuable feature of Carrel's method, and should be carried out if possible.

"It consists in counting the number of pus-producing micro-organisms present in the wound during the stages of its evolution. The smear taken during the first six or seven days shows that the exudation consists of an enormous number of microbes and polymorphonuclear leukocytes. The polymorphonuclears gradually disappear after the seventh day. Small mononuclears appear in their place, the microbes decreasing at the same time. The macrophages appear after the tenth or eleventh day. At this time but few are found in the field; the bacteria are frequently incorporated by the phagocytes. De Page considers the appearance of the macrophages a favor-




APPARATUS FOR APPLYING CARREL-DAKIN SOLUTION

This apparatus is furnished by instrument dealers. Supplied by Johnson & Johnson on request.

A—Reservoir graduated.
B—Clamp for regulating flow.
C—Sight feed cup.
D—Four-way glass distributor.
E—Perforated distributing tubes with ends tied. When used for surface ends are covered with Turkish toweling.
F—Five-way glass distributor.
G—One tube glass distributor.
H—Two-way glass distributor.
I—Syringe for applying solution by hand.
J—Flask for use with syringe.

able symptom, indicating that the wound is becoming aseptic.

"To follow the course of infection, a bacterial chart resembling very much the temperature chart, has been devised by Carrel. In a general way the bacterial curve of the wounds treated by Carrel's method followed a characteristic course. As many as one thousand microbes can be counted in a single field in virulent infections. During the course of treatment of the wounds, the chart may indicate more or less marked oscillation, but notwithstanding these oscillations the general tendency is toward descension of the bacterial curve, which arrives at zero after five to twenty-five days of treatment.

"The superficial wounds are more rapidly sterilized and can be sutured at the end of six to ten days. The extensively infected wounds require a longer period to become aseptic—usually fifteen to twenty-five days. Extreme care should be taken to obtain smears from different parts of the wounds in compound fractures; smears should be taken from the bone and from the different portions of the wound before suture is attempted. Compound fractures are generally sterilized within fifteen to twenty-five days.

"Smears should be made every two or three days and the bacterial count should be recorded on the chart. After the bacteria have been reduced to an average of one bacterium to five fields, counting at least twenty fields to secure this average, and this result has been obtained for four or five consecutive days, suture may be accomplished empirically and union by first intention secured. The wounds should not be sutured until the area has only one bacterium to five fields. If they are sutured while there is one bacterium to one or two fields, there is a tendency toward stitch abscess."

# Dressing Burns with Redintol

## Wonderful Results Are Being Produced in the French War Hospitals and in this Country with a New Dressing of a Hot Solution of Waxes and Resins—The Technique of Operators

Standing out prominently among the surgical achievements revealed by the European war is a new dressing for burns and granulating wounds. The dressing is simplicity itself, but the results are marvelous. By applying a hot solution of waxes and resins upon the burn wound, pain is immediately relieved, an air-excluding shell is formed over the wound and nature is permitted to do its healing under the most favorable conditions.

A number of American surgeons who studied the new method of dressing burn wounds in France are enthusiastic in their reports. They brought back to this country some of the dressing compound used at the Hospital St. Nicolas at Issy-sur-Molineaux.

The result has been that this compound, which is called "ambrine," has been exploited in medical, lay and technical journals as a "wonderful healing substance" and surgeons throughout the country have become greatly interested in it.

Dr. Wm. O'Neill Sherman, chief surgeon of the Carnegie Steel Co., at Pittsburgh, Pa., during a study of wound disinfection methods employed by the European surgeons on the battlefields, became interested in the French compound for dressing wounds and brought a quantity of the compound back to this country with him. He used it not only in burn cases, but also in granulating wounds. "Those not familiar with the results in France," Dr. Sherman is quoted as saying, "are dumbfounded at the rapidity with which the wounds heal. I simply should not know what to do without it."

Dr. Sherman has described and illustrated his work with the substance before medical gatherings in Buffalo, Philadelphia, Chicago and other cities, including the Mayo Clinic at Rochester, Minn.

The French compound, a secret formula, but said to be a mixture of wax and resins, has been difficult to obtain and has sold at fanciful prices. Numerous surgeons, who had become interested and who had been unable to secure the French compound, appealed to Johnson & Johnson. They believed that the same compound could be produced in this country and felt that this country should have the benefit of its wonderful properties.

The Scientific Department of Johnson & Johnson, after a long series of exhaustive experiments and tests, produced Redintol to take the place of the French compound. This preparation is a mixture of paraffin and resins, having dissimilar melting points, supplied in a solid brown wax-like cake. In appearance it looks like a cake of maple sugar.

Redintol has been used in hospitals and private practice for several months. Surgeons have been surprised at the results. They have found that the dressing is easy to apply; that pain is relieved almost immediately; that the dressing can be removed without disturbing the wound and that the healing is rapid.

Briefly summarized, the principal properties of Redintol are:

Redintol becomes fluid at about 120° F. It is applied to the tissues at a temperature of about 140° to 150° F. In

THE UNDERGROUND HOSPITAL

Under constant bombardment the surface of the earth became untenable in Northern France. Slow convoys of wounded cannot pass along the roads. So underground hospitals abound, and here is seen one of the wardrooms. The beds are of rustic fashion, but here the wounded wait in patience until the fire storm has passed.

other words, when melted until it flows it is ready to apply.

Redintol is analgesic; it forms at once an occlusive dressing, under which tissues rapidly heal.

Redintol, when melted, does not seem to burn the tissues; at least no sensitiveness is felt from the burned area, granulated surface, etc. On the other hand, it relieves the acute pain caused by the burn.

Redintol dressing is plastic and elastic. At the temperature of the body it is sufficiently mobile to form a glaze, which conforms to the tissue so that each cell is covered.

Redintol dressing adjusts itself to the injured area, and is easily removed without causing pain in the slightest degree.

Removal of the dressing is accomplished without hemorrhage and without tearing the newly formed cells.

Redintol dressing promotes the healing of the tissues without the usual scarring, without contraction of the skin or tendons, and generally with the absence of functional weakness.

Redintol dressing constitutes a shell or covering, under which there is a rapid reformation of new skin.

Skin grafting is in most instances unnecessary where this dressing is employed.

In the methods heretofore used for treating burns the frequent tearing away of the newly formed cells in removing the dressing has been the cause of pain. The Redintol method is practically painless—the patients like the treatment.

METHOD OF APPLICATION

The technique here given has been gathered from the suggestions of operators who have used Redintol dressing. Other procedures will suggest themselves to the individual surgeon.

Certain points are apparent.

Redintol is perfectly anhydrous, and must be kept and applied absolutely free from moisture. It must be applied to a wound which, so far as possible, has been made dry.

A small amount of water in the dressing, or a wet wound surface, will cause pain. When free from water hot Redintol dressing is analgesic.

Melt the Redintol in any convenient vessel, either directly over the fire or by setting the vessel in hot or boiling water. If melted by the latter method take care that no water splashes into the melting fluid.

Redintol melts at 120° F., and is to be applied at a temperature not below 140° F. nor above 150° F.

A thermometer should be used.

Apply the melted Redintol to the injured surface with a camel's hair brush, spreading it over the surface with a gentle dabbing, not pressing, and not brushing like paint. Cover the entire area including about one-half inch beyond the edges of the injury. Take care to leave no spot uncovered.

The melted Redintol may cause a twinge when applied to the uninjured area.

Place at once over the wax glaze, while still warm, a thin layer of absorbent cotton, made by splitting layers of cotton from a roll cut into convenient size pieces. The layers of cotton may be gently pressed into the glaze. Over the layer of absorbent cotton give another coat of the melted Redintol by gentle dabbing, as before.

Johnson & Johnson prepare a special form of sheet cotton for use with Redintol. This, or the ordinary absorbent cotton, may be used. In extensive areas small squares may be treated successively to avoid the cooling of the first coating. The whole will then join together as one shell.

When the coating is complete it may be covered with the usual gauze, cotton or lint dressing, which in turn may be held in place with a bandage or adhesive plaster.

For the first few days the shell should be removed every twenty-four hours. This for the reason that there will usually be found to be an abundant flow of lymph beneath the shell. After a few days this exudation diminishes and the dressing can be left in place for a longer period.

RE-DRESSING THE BURN

Each day after the removal of the wax the burn is examined and it is essential here that it be let alone as much as possible. Of course at first all sloughing spots and pus must be taken away but it is essential that it be done as gently as possible. One satisfactory method is to lay gently on the wound a piece of gauze, touching it lightly with the finger tips and thus removing such pus as may be present, exactly as a blotter is used after writing with pen and ink. The next thing is to dry the surface of the burn. This is done by one of the hot air electric driers such as the barbers use for drying the hair. Fanning by hand will accomplish the same result more slowly and imperfectly. Before this treatment, the burn is bright red and covered with a watery exudate. This should be dried by means of a fan until it has a dull varnish-like appearance, after which a new coat of Redintol is applied as before. There should be no wiping, but a gentle dabbing in order to avoid disturbance of granulations, and to prevent bleeding.

Certain operators have used a special apparatus for the application of Redintol, such as an atomizer, so as to blow a fine spray of the melted Redintol upon the burned surface.

(*Continued on page* 209)

## ANTISEPTIC SOAPS

**The Use of Medicated Soaps by the Profession as a Means Towards the Destruction and Elimination of Infection—Soaps the Surgeon Can Use with Confidence.**

The utility of medicated soaps for the physician and the surgeon, and especially for the dermatologist, is recognized. Dr. Robert Shoemaker made the statement that "the fact that the very agent which cleanses a certain area is also the vehicle by which a remedy is applied, is a sound argument for the employment of medicated soaps."

The effect of soap upon the skin is both mechanical and chemical. It not only cleanses the cutaneous surface, removing foreign matter and physiological and pathological products, but penetrates into the glands and, by dissolving the fatty material filling the ducts, facilitates its removal.

Soap also exerts an influence upon the nutrition of the skin, stimulating its functions and promoting the absorption of the inflammatory exudates.

Medicated soaps have long been recognized as a means for applying remedies in cutaneous diseases. In this condition, in addition to the solvent and cleansing action of the soap, there is a promotion of the absorption of the incorporated medicament. In the lather of a medicated soap, when applied to the skin, the contained drug is not only rendered active and soluble, but is enabled to penetrate parts otherwise inaccessible.

In addition to the medicinal effects of such soaps, it has been demonstrated that many of the antiseptics, when combined with the soap base, exhibit a more powerful bacterial and germicidal action than from any other form of application. Hence the use of antiseptic soaps for the disinfection of the skin of the patient, the hands of the surgeon and his assistants. Antiseptic soaps have also attained a large use in the handling of infectious disease in epidemics, etc.

From this it may be urged that the extension of the use of antiseptic soaps in the home where contagious disease prevails, and in public lavatories, would be desirable.

There seems to be no good reason why antiseptic soaps, especially those of certain kinds, might not well be substituted for the ordinary toilet soap for domestic use.

Many toilet soaps are indifferently prepared, from questionable fats. They are often highly perfumed to overcome decomposed or objectionable ingredients.

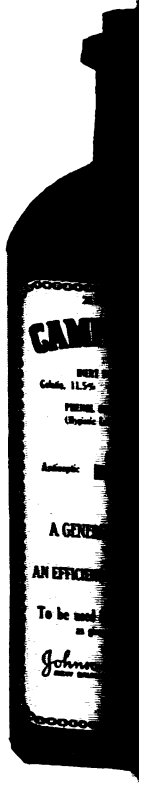
Thus it may be urged that the use of medicated soaps in the hands of the practitioner would be found a useful adjunct, especially in the treatment of cutaneous diseases, and that the use of antiseptic soaps by the profession and by the laity will be one means towards the destruction and elimination of infection.

Johnson & Johnson manufacture a line of medicated and antiseptic soaps, which already have attained a large use both by the profession and laity. These soaps are made from neutral white soap, contain no added ingredients or filling material, no coloring matter or pigments whatever. These soaps are guaranteed to contain the percentage of medicament as stated on the label.

The list of medicated, antiseptic and other soaps prepared by Johnson & Johnson is as follows:

BORATED SOAP—(Medication, boracic acid 5%). This soap has been extensively employed in parasitic affections of the skin, especially in diseases attended with fetid secretions and crusts. Being perfectly non-irritating, innoxious and odorless it can be employed with perfect safety as an ordinary toilet soap.

# Soaps and Antiseptics Worthy

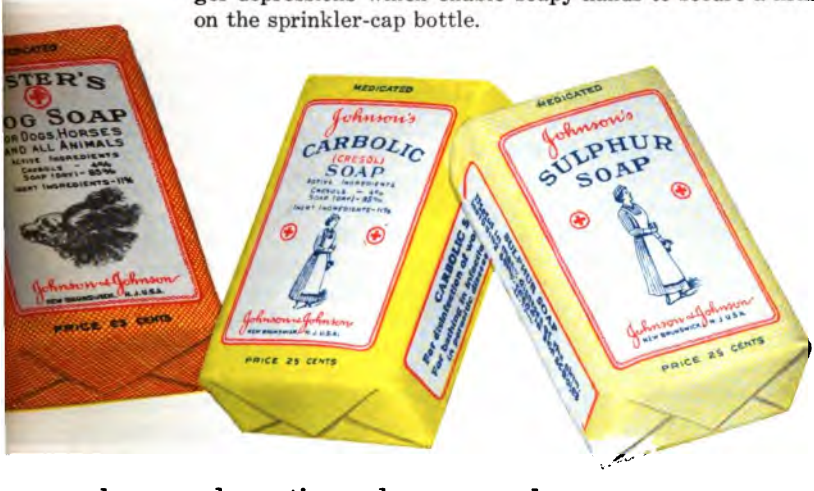


Synol Soap is now supplied in cake form. It retains all of the sterilizing qualities which have made liquid Synol the foremost soap for surgeons. Two cakes in a packet.

A group of medicated soaps that you can safely u
to your patients. Liter

# ıe Profession's Confidence

**The new style bottle for liquid Synol Soap. Note the finger depressions which enable soapy hands to secure a firm grip** on the sprinkler-cap bottle.




ır own home and practice and recommend
ıt on application.

CARBOLIC SOAP (CRESOL)—(Medication cresols 4%). The cresols are known as powerful but innoxious antiseptics, and in this form enjoy an extensive use in both medical and surgical practice.

This soap is an efficient means of disinfection in surgery, as well as a disinfectant in infectious diseases, and in the treatment of certain parasitic infections of the skin.

LANOLIN SOAP—(Lanolin 10%). In addition to its qualities of a soap proper, in using this soap there is left on the skin a layer of lanolin, which acts as a most excellent dressing for tender skin. Can be used with excellent effects as a toilet soap.

SULPHUR SOAP—(Medication flowers of sulphur 5%). The mild stimulating emollient properties of sulphur soap have long been known, and have been popular both with the profession and the laity. Sulphur soap is indicated in such disorders as acne rosacea, seborrhea, and other parasitic affections, particularly in scabies.

TAR SOAP—(Medication tar 5%). Tar soap has been used for many years in the treatment of chronic scaly eruptions of the skin, particularly eczema and psoriasis. Tar soap has the important property of allaying itching. It has also been employed in pityriasis and ichthyosis.

SUBLIMATED SOAP—(Medication bichloride of mercury 1%). This soap is said to be of special value in the treatment of parasitic affections of the skin, particularly in scabies, ringworms, favus, pediculosis, etc. In connection with topical remedies it has also been used in syphilitic infection of the skin.

By some practitioners this soap is also employed as a disinfectant in surgical cases, in contagious disease, and for general purposes in the office, the hospital and the household.

SYNOL SOAP—Synol Soap is supplied in two forms—liquid and cake. This soap has been long in use for the sterilization of hands of the surgeon, the nurse, in the operating room, as well as for general use in the hospital, the office and the household.

Synol Soap, either in cake or liquid form, has powerful germicidal properties. It has been clearly established by acknowledged standards that Synol Soap, either in cake or liquid form, will destroy at once the common disease-producing and pus-producing organisms. In addition to this, Synol is a most thorough cleansing agent. It removes and emulsifies all dirt and grease, thus allowing the penetration of its germicidal contents.

Synol is an excellent bathing and shampoo soap.

Synol has found an important use in the sick room, especially in contagious disease.

### HOW TO USE MEDICATED SOAP

The following suggestions for the use of medicated soaps were gathered from various authorities.

To secure a mild action use medicated soap in the same manner as toilet soap. By this method the soap remains on the skin only a short time before it is rinsed off.

The effect of the soap application varies in intensity according to the length of time the lather is left in contact with the skin. More active effects are produced when the lather is rubbed into the skin and allowed to remain for a few minutes and then wiped off with a towel or permitted to dry.

More intense action is secured by applying an impervious dressing, such as oiled silk or rubber tissue, after a thorough inunction with the soap.

(*Continued from page* 204)

The important point is the avoidance of stroking the surface of the wound; rather a gentle touching or dabbing with the side of a fine camel's hair brush.

The great and peculiar difference between the Redintol and other forms of treatment is that with the Redintol treatment all disturbance of the newly forming cells is avoided.

The melted fluid should be applied very gently over the uninjured surface, which is more sensitive than the injured area.

After a few days' treatment, upon removal of the dressing a definite border of rapidly proliferating tissue will be found, and if there are any undestroyed cells, islands of new skin will appear as grayish-white spots dotting the surface. If the burn has left portions of epidermal tissue, the Redintol method of treatment will save it and favor its rapid repair. Under the dressing new skin begins to form almost immediately, and in an exceedingly short space of time the entire surface begins to be covered.

A peculiar odor is developed in the burned areas under the Redintol dressing and is evidently due to the growth of certain anaerobic organisms.

After a few days' treatment with Redintol, a thin delicate growth of newly formed skin tissue can be seen along the edges of the wound creeping in and reducing the area of the burned surface. Injury to these cells should be most studiously and carefully avoided.

Redintol has also been found useful in the treatment of chilblains, frost bites, bruises, excoriations, and in conditions of raw, denuded, or inflamed areas.

It is believed that many other uses will be developed when the effects of this compound shall have been fully understood.

Reports which have reached this country from France tell of the wonderful success of the French compound which is similar to Redintol. A correspondent of Le Figaro, who visited the hospital at Issy, wrote that some whose faces were "unrecognizable under a sort of glazing that covered them," assured him that they suffered no pain.

American surgeons who have used Redintol have found that the patient suffers no pain from the application of the dressing and that the healing is very rapid.

The length of time for complete healing largely depends on the promptness with which the treatment is begun. One story which has come from France illustrates this: A young army doctor was brought to Issy who had been terribly burned six weeks before. His hands by that time were permanently drawn, the fingers cramped so that they could not be straightened.

This young doctor watched other men brought in with similar wounds, saw them gradually regain perfect muscular flexibility and realized his own misfortune in not having had his wounds dressed with the wax compound.

## THE RESULTS IN FRANCE

The New York Medical Times of March 10, 1917, in an editorial upon the French preparation and other similar compounds for the treatment of burns, says:

"We have several times referred to the apparently remarkable results obtained in France by the use of a paraffin preparation in the treatment of burns. A number of reports regarding this have appeared in the French medical journals and accounts have also appeared on this side in both the lay and the medical press. Our own Paris correspondent, who is a well known physician of wide

experience, wrote a few weeks ago in such almost extravagant terms of its healing properties that had he been a man of less assured standing and judgment his letter would probably never have seen the light.

"The testimony of English writers also who have seen the remedy applied in France, is all of the same tenor. Lieutenant-Colonel Hull of the Royal Army Medical Corps, says that, under the use of the French preparation, 'burns healed with rapidity; constitutional symptoms rapidly abated; pain was reduced to a minimum; scarring appeared to be obviated, or at any rate was not apparent. The need for grafting large burns appeared to be avoided. The burns healed so rapidly with healthy granulations that there appeared to be nothing to be gained by grafting. The patients were singularly free from sepsis. The conclusion arrived at from experimenting with the treatment was that mild burns healed with singular rapidity, and severe cases recovered which would have been unlikely to recover by the ordinary methods of treatment.

"'Observers who had had large experience of burns treated by picric acid, ointments, and other methods in ordinary use, were unanimously of the opinion that the paraffin method was superior to the older methods. The experience of those who had witnessed the results of burns after liquid fire attacks was that the French treatment would save many lives, and accelerate the recovery of all burns.

"'Severe burns of the third degree, accompanied by sloughing, and in a very septic condition, have cleaned and taken on healthy repair under this treatment. Severe burns of both palmar and dorsal surfaces of the hands, extending to the tendon sheaths, have healed in three weeks without contracting cicatrices.'"

## IODINE APPLICATOR

Johnson & Johnson have placed upon the market an improved form of iodine applicator. This applicator consists of a glass tube holding one cubic centimeter of half-strength iodine, sufficient to cover any ordinary injury. In large

areas two or more applicators may be used.

The applicator provides a safe, practical and convenient way to apply iodine. The tube is pointed at one end and over this end a cotton brush is affixed, being held firm to the tube by means of adhesive plaster. This brush must not be removed. To use the applicator, break the pointed end of the tube with the finger at the line where the cotton and adhesive plaster meet.

---

## THE FIRST AID CHART

Physicians whose practice includes care of the injured at industrial plants will appreciate the following extract from a letter received from Dr. Ira S. Wile, of 230 West 97th Street, New York City:

"The First Aid Chart which you sent me is excellent and I think should be posted in every industrial establishment employing 25 persons or more. It is simple and practical and so generally self-explanatory that it could be understood by shop foremen."

The chart is 27 x 44 inches in size and is mounted on heavy board. It folds for carrying. The front is in ten colors and the back contains full first aid instructions in black and white. It is a complete working guide to first aid. The chart is sold at three dollars each by druggists and physicians' supply houses.

# Treatment of the Wounded in Flanders

## Hours Often Pass Before Wounded Soldiers Can Be Carried to the Clearing Hospital, Where they are Sorted According to Injuries

The following notes as to the handling of the wounded at the front in Belgium and France have been abstracted from the writings of personal correspondence of those who have had experience with the contending forces:

After the wounded soldier has had his wounds temporarily dressed by an ambulance surgeon or perhaps by a fellow soldier, he is carried to a point where he can be wheeled to an ambulance.

"The battles in Belgium and Northern France were conducted on fields that had been cultivated for centuries, the soil being enriched with the fecal matter of poultry, pigs, horses, cows, cattle and humans. The bodies and clothing of the combatants were impregnated with mud and dust. The opportunities for bathing and changing of clothing were most infrequent, in many cases weeks and months elapsed without change. The micro-organisms in the soil found a fertile medium in the human tissues. The lowered state of vitality and weakness due to loss of sleep, exposure, anxiety, and nervous strain lowered the general resisting powers.

"Many of the wounded lay where they fell in No Man's Land from twelve to forty-eight hours before receiving attention. The shell or bullet wounds not only caused great damage to the tissues, but they carried into the tract of the wound virulent bacteria. The delay in bringing the wounded from the firing line is lamentable, but unfortunately cannot be prevented."

Under the prevailing conditions at the front, it is a matter of chance who may apply the first field dressing. In many instances it may not be applied for hours and sometimes days may elapse. This dressing usually consists of a gauze pad affixed to a bandage (a gauze compress). Sometimes the wound may be painted

Two-wheeled vehicles are used to carry the wounded to the ambulances waiting in a sheltered place. The soldiers are handled as gently as possible under the circumstances.

with iodine which is supplied to the soldier in glass ampoules. The missiles in most cases carry infection into the depths of the wound. At best the first aid dressing will only prevent secondary contamination of the wound from the patient's clothing and skin. The first dressing has probably been applied by the soldier or his comrade with dirty

Upon arrival at the hospital the wounded soldiers are sorted according to their injuries, labeled and then carried to the hospitals, each class of injuries going to the hospital handling that class of cases.

hands to a dirty skin; even if applied by medical officers it has not been under favorable conditions.

In the trench warfare the Ambulance Corps can only approach at night, and often the clearing hospitals are miles distant from the point. Little or no attention can be given to the wounded until they arrive at the clearing station, which may be a depot platform, a shed, a warehouse, and in many instances it is simply a cleared spot in a yard. Here the wounded are sorted and a more or less improvised and hasty re-dressing of the wound is performed. For large wounds, shrapnel shells, explosions, etc., what has been called a "shrapnel dressing" has been devised. This is described by Dr. H. H. M. Lyle, as follows:

"The dressing used at the French hospitals and in the field consists of a thick layer of absorbent cotton covered with a thicker layer of non-absorbent cotton, the whole encased in gauze. These dressings are about 3 cm. (1¼ inch) thick, and of different sizes. The three sizes most commonly used are—one large enough to surround a leg once, a second of a size to surround the arm, and a third still smaller. Webbing straps with buckles are used to fasten the dressings in place."

The object of this dressing is that it can be quickly applied after the preliminary treatment of the wound and the patient can be transported to the hospital. Wherever it can be done, at this point there is a thorough mechanical disinfection of the wound with an examination for shell fragments, parts of clothing, etc.; if too much time has not elapsed between the time of the injury and the dressing the operative field is painted with tincture of iodine and the bruised edges of the skin are trimmed away. Sometimes the wound is laid open and explored for shell fragments, pieces of clothing, etc.; so far as possible the tissues are preserved. At this point at times the Carrel-Dakin solution has been used to saturate the dressings. From this point the patient is sent to a hospital where the real surgical treatment begins.

It was amid the conditions here briefly outlined—within hearing and sometimes within striking distance of exploding shells, surrounded by suffocating gases, standing at times more than ankle deep in mud and slush, with thousands of wounded men calling for immediate treatment, untiring and as heroic as the men in the trenches or behind the guns—that Carrel, Wright, Grey, Morrison, and others have evolved their methods of wound treatment. Out of this has come the Carrel-Dakin method of wound sterilization which is rapidly becoming adopted not only for use in military but industrial and civic practice as well.

---

## A NEW ANTISEPTIC GAUZE

Boralum Gauze is an important addition to Johnson & Johnson's line of antiseptic gauzes, which includes Carbolated Gauze, Corrosive Sublimate Gauze and Iodoform Gauze. It is prepared by impregnating absorbent gauze with a specially prepared solution of boroglycerid and aluminum acetate.

Such a wound dressing was first used in the European war hospitals with such satisfactory results that American surgeons became greatly interested in it. Boralum Gauze acts as a mild astringent, exsiccant and hemostatic. A dressing of this character has been largely used with good results for the following purposes:

As an application to fresh wounds, especially lacerated wounds.

As a dressing for infected wounds.

As a dressing for burns, old sores, ulcers and especially bed sores.

As an absorbent and deodorant for purulent discharges.

As an application in inflamed conditions.

As an application in diseases of the skin.

Boralum Gauze has the well known antiseptic properties of boroglycerid and aluminum acetate. It will be found useful for a large variety of purposes, both in surgical and medical practice and undoubtedly will be adopted generally as an excellent first aid dressing.

The gauze may be applied either moist or dry. The dry gauze dipped in water or the Linton moist form will be found an efficient substitute for the well known acetate of lead solution, with the added value of boroglycerid.

Boralum Gauze is put up in the following forms:

Yard and Five Yard rolls in cardboard containers.

One Yard and Five Yards in glass jars—Linton.

This 125-page book contains terse descriptions and accurate illustrations of the principal Johnson & Johnson products. Send for free copy.

## Pasteur — Lister — Carrel

In the discussion of the methods of wound treatment which have arisen out of the war the names of Pasteur, Lister and Carrel have been associated favorably and adversely.

Pasteur was the prophet of the modern era of surgery, as Lister was its apostle.

Lister's methods were revolutionary and through them medicine and surgery over night leaped ahead scores of thousands of years.

Pasteur overthrew the doctrines of spontaneous generation, caught the microbes of disease and opened the grand vista of bacteriology.

Lister took up the principles established by Pasteur and applied them to the repair of wounds, and from Lister's great conception was born modern surgical antisepsis, from which in turn was evolved asepsis.

Pasteur was a biologist.

Lister introduced what has been termed the pathological era in surgery, the dominant idea of which is "to prevent the entrance and development of bacteria in wounds and to remove the products of infection."

Lister used antiseptics, crudely at first. By evolution of methods, aseptic proceedings arose overshadownig the early Listerism. Asepsis can be considered as but the amplification or extension of antisepsis; antiseptics (including heat and cleanliness) still being employed to reach the end sought by Lister.

Now comes Carrel, who, in the eyes of some of his critics, has only turned out another antiseptic. These critics point to the fact that the use of hypochlorites as destroyers of putrefaction is very old. On the other hand, many who have followed Carrel's work claim that he deserves to rank with Pasteur and Lister; that he has met and solved the same problem; that in his methods we may be looking back to Lister but at the same time are seeing the dawn of a new era in surgery.

Carrel is a physiologist—his surgery is physiologic. His aim is to conserve the natural resistance of the patient, "to turn the tide of battle only and to leave the patient with his physiology as nearly intact as possible."

Under the Carrel method, it is stated, the surgeon has control of the course of the wound—the entire process of repair is under his command. The Carrel method is, in its simplest form, a method of sterilizing wounds. "It is not dependent upon the miraculous power of any antiseptic or on any one feature of the method, but upon the combination of the whole."

Carrel's followers claim that his work is designed "to reduce the gravity of mutilations, to save many lives."

It may be in this that we are swinging back to Lister, but in the rebound we are going forward to Carrel.

As in the case of Pasteur and Lister there will be many who will scoff and who will not believe, there will be failures and there will be successes, but out of the evolution there may come such advancement as will warrant the linking together of the names of Pasteur, Lister and Carrel.

### IMPORTANT NOTICE

For the present the tubes containing the powders for the Carrel-Dakin Solution will be supplied only to hospitals. They cannot be supplied through the ordinary channels of trade. The apparatus used in applying the solution can be obtained through instrument dealers or will be supplied by Johnson & Johnson on request.

# The New Pharmacopeia and the National Formulary

The Ninth Revision of the United States Pharmacopeia and the Fourth Edition of the National Formulary are now in full force and effect.

These publications are now the legal standard for all drugs and medicines embraced therein under the National Food and Drugs Act as well as under the various State laws pertaining to drugs and medicines.

We will not attempt to review these publications, but deem it advisable to call attention to a few items embraced therein which are directly connected with the line in which the Notes is interested.

In regard to plasters it is to be noted that the revisers have introduced emplastrum elasticum, or rubber adhesive, which they have described as "a mixture of rubber, resins and waxes with a filler of absorbent powder, mechanically mixed and spread on cloth or other fabric." This is essentially the rubber adhesive plaster of the market and which now for the first time becomes official.

The resin plaster of the Pharmacopeia of 1890 has been revised.

Diachylon plaster has been retained with a revised formula.

Emplastrum cantharidis has been admitted to the Pharmacopeia. The formula is a cantharides cerate spread upon resin plaster. This is substantially a restoration of the old time method of making blister plasters.

The standard strength of belladonna plasters is fixed as "not less than 0.35% nor more than 0.40% of the alkaloid of belladonna." The assay process is also given.

Capsicum plaster has been retained.

Charta sinapis of the former edition has been changed to emplastrum sinapis or mustard plaster and a standard has been prescribed.

Emplastrum hydrargyri and emplastrum saponis have been discontinued from the Pharmacopeia.

In respect to plasters the National Formulary has retained the Camphorated Brown Plasters of the former editions and has taken over the Soap Plaster of the U. S. P. VIII.

In the Pharmacopeia considerable revision has taken place in the text relating to absorbent cotton. It is now required to be "free from adhering impurities, linters, and deprived of fatty matter." Tests are given for absorbency, standards are prescribed for the amount of ash, the absence of alkali or acid, the absence of fatty matter and the absence of resins and soap.

In both the Pharmacopeia and the National Formulary chapters are given covering the subject of sterilization.

The laboratory force of Johnson & Johnson were privileged as well as pleased to accord the revision committee assistance and suggestions in regard to the subjects which come under their observation.

It is probably unnecessary to repeat the statement that the preparations of Johnson & Johnson, so far as they may be affected by the Pharmacopeia, will be found to comply with the standard and that the materials which enter into them and the finished product are judged by the standards outlined in the Pharmacopeia and the National Formulary.

---

## SPECIAL NOTICE

Hospitals or surgeons who wish to adopt the Carrel-Dakin method of wound sterilization are invited to correspond with the Scientific Department of Johnson & Johnson.

## CATGUT AS A SKIN SUTURE

Dr. William Perrin Nicolson, of Atlanta, in a recent paper stated that the use of catgut as a skin suture had been opposed and rejected by many surgeons on account of objections which could be overcome. It was alleged that it became a safe suture just in proportion as the integrity of the skin was not damaged by excessive efforts at disinfection, and that a skin simply prepared would handle catgut as safely as any form of suture. The ideal condition surrounding an operative wound was that it should be made under aseptic conditions and closed with a suture which could in the end be disposed of by the tissues, thus permitting the original dressing to remain in place until healing was complete. Such a condition could occur only under the use of catgut sutures in the skin.

The two objections urged against the use of such a suture had been, first, that the animal suture became a good culture medium for the bacteria in the skin, and second, that too early absorption might permit the wound edges to gape before healing had taken place. It was stated that the first condition was largely overcome by simple cleansing of the skin, which consisted of washing with soap and water and alcohol, and afterward applying tincture of iodine upon the perfectly dry skin, and this permitted to remain for about two minutes, after which it was washed off with alcohol. The second was overcome by the use of twenty-day chromic catgut. The size employed was the OO under ordinary conditions, and perhaps a little larger size, where there was more strain upon the wound.

The method of closing wounds advocated was the continuous running suture placed at intervals of from one-half to three-fourths of an inch, and passing beneath the skin into the subcutaneous fat, which permitted the wound line to fall into perfect apposition, while at the same time the edges could be pulled apart at any point between the stitches. This permitted of drainage directly between the wound edges into the dressings, doing away with the necessity for a drain, while the blood serum drying in the gauze next to the wound made a perfect aseptic covering, practically impervious to air and water. Such wounds might be left without disturbance until healing was complete, when the dressing was removed permanently.

All classes of wounds, including scalp wounds, hernia operations, breast amputations, kidney operations, were closed thus with chromic catgut and left until healing was complete. The catgut employed was that sterilized without chemicals, as it had been found that those sutures which contained iodine and mercurial salts had proved irritating to the tissues immediately surrounding the suture.

In conclusion, it was averred that such a condition removed the dread that every patient naturally had of the removal of stitches and change of dressings, and did away with the danger of infection, however remote, which attended upon exposure of the wound for the purpose of dressing and removing sutures.

---

## NEW FORMS OF SUTURES

Surgeons may now buy Blood-Vessel Sutures, Intestinal Sutures, Circumcision Sutures and Obstetrical Sutures of the Johnson & Johnson quality at drug stores and physicians' supply houses. These special forms were recently added to the list of ligatures made by Johnson & Johnson and they have been found timely, satisfactory and very convenient by operators.

The Blood-Vessel Sutures are prepared according to directions of Dr. B. M.

Bernheim, of Baltimore, Md., of very fine black silk in a very fine straight, round needle. Each suture is sterilized in liquid vaseline in a tube and three tubes are packed in a box.

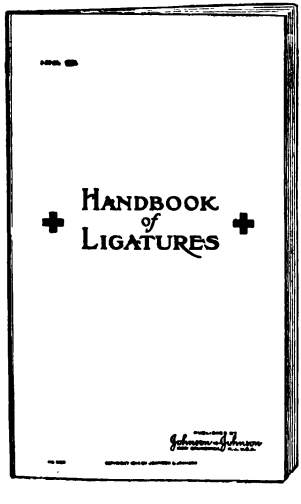
The Intestinal Suture consists of one yard of black silk threaded in a straight, fine needle in such a way that there is no doubling of the silk through the eye of the needle. The silk is twisted after being threaded through the eye. Each tube is packed in an individual box.

The Circumcision Suture consists of thirty inches of No. 0 plain catgut threaded in a regular full-curved No. 14 needle put up in a tube. Each tube is packed in an individual box and one dozen of these are packed in an outside box.

The Obstetrical Suture consists of 36 inches of No. 3 extra-hard chromic catgut threaded in a regular full-curved No. 4 needle put up in a tube. Each tube is packed in an individual box.

## HANDBOOK OF LIGATURES

An excellent volume of information on the subject of Ligatures is the Handbook of Ligatures published by the Scientific Department of Johnson & Johnson. The Johnson & Johnson laboratories have made an extensive study of catgut, and the result of their research work conducted during the past thirty years is worthy of the close attention of surgeons. The Handbook consists of forty-eight pages and is illustrated. A copy will be sent to any physician or nurse on request, with the compliments of the publishers.




## INSTRUCTIVE BULLETINS

The series of Contagious Disease Bulletins issued by Johnson & Johnson has been completely revised and brought up to date. These bulletins have proven a valuable aid to physicians and to Health Boards in times of epidemics and also as a means of conducting campaigns of education. They are written from the standpoint of the best authorities upon sanitation and embrace the latest and best known methods used by Health Boards to combat contagious and infectious diseases. The list of Bulletins is as follows:

Diphtheria and Scarlet Fever Bulletin, No. 28.

Typhoid Fever and Allied Diseases Bulletin, No. 29.

Infantile Paralysis and Meningitis Bulletin, No. 38.

Whooping Cough and Measles Bulletin, No. 40.

Consumption Bulletin, No. 56.

Smallpox Bulletin, No. 57.

A set of these bulletins, together with a copy of "A Book With a Mission," gathered together under one cover, will be sent free to any physician, nurse, health officer or other interested person upon request.

Health officers, societies and others who may desire to secure quantities of any of the Bulletins for circulation are invited to correspond with Johnson & Johnson.

## WHAT IS FIRST AID?

What constitutes "first aid" is a question of considerable importance, owing to the great increase of accident and liability insurance. So far as we are aware, no judicial decision has been handed down defining first aid, but a brief reference to the manner in which the term came into general use will aid one in arriving at a clear understanding of the scope of its meaning.

When a person is accidentally injured, or suddenly taken ill, it is perfectly natural for those about him to render any aid or assistance within their knowledge and power. The humanitarian principle underlying such service has been long recognized, and has inspired the formation of societies of laymen, the members of which receive a certain amount of instruction in order that they may be better able to render such service in an emergency. These societies are usually called first aid societies, the idea being to give aid pending the arrival of a physician or surgeon.

The importance of doing something to relieve the injured, and particularly in case of wounds to protect them from infection as much as possible, has caused most industries, railroads, etc., to provide first aid outfits and to have certain of the men instructed in giving first aid until the patient can be turned over to a physician, or can be removed to a settled place, such as his home or a hospital. There can be no question that the service thus rendered by laymen in such emergencies is first aid, but now suppose the one nearest at hand to the injured is a physician, or suppose that someone with no other authority than that of trying to do something to aid one in trouble, summons a physician, does the physician give first aid, and if so, what is included in first aid? Should the patient require anything more than a momentary service, it is perfectly evident that he must be removed to some suitable place, such as his home or a hospital, before any definite line of treatment can be undertaken.

Such temporary measures, then, as may be used to enable or to facilitate the removal of the patient to some settled place where a definite line of treatment may be instituted, constitute first aid, whether it be given by a physician or a layman. The fact that the physician's efforts may be more intelligent than the layman's does not change the principle.

When the patient has reached his home, or a hospital, or other place, and is turned over to his own physician or to the hospital surgeon, or wishes to continue the services of the physician first called, then first aid ceases, and definite treatment begins. In large cities many patients suffering with injuries are brought to a hospital without ever having received first aid, unless the mere act of transporting them may be considered first aid. After such a patient reaches the hospital he does not receive first aid, but definite treatment is instituted, and by the mere fact that the first thing done for him is done at the hospital, that first thing does not constitute first aid.

First aid, then, may be defined as the temporary measures carried out in emergencies by anyone—layman or physician—preliminary to the institution of a definite line of treatment by the physician in charge—*Jour. Amer. Med. Ass'n.*

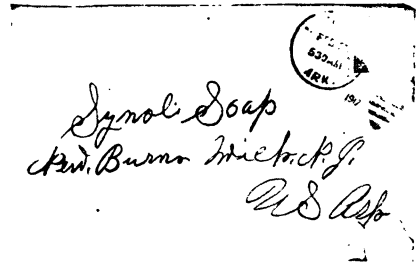
## SIMPLICITY IN BANDAGING

Many useless niceties of manipulation have been handed down to us from past generations of authors. Some of them are still scrupulously taught to students, and particularly to the pupils in nurses' training schools. They are burdensome to acquire and for the most part they are promptly forgotten or altogether ignored in actual practice. For example, who ever stops to think of the tour de maitre in passing a urethal sound?

When a practitioner has really become possessed of manipulative skill he is apt to find himself giving up the precise steps laid down in the text-books and relying more and more on a certain knack that has come to him with experience.

Perhaps it is most noticeable in teaching the art of bandaging that traditions long ago ignored in practice are made to appear of present importance. In many of the current illustrations employed mathematical preciseness of appearance is made to predominate over utility and real effectiveness, so that it seems to be thought that the serrations of a reversed roller bandage must fall in an absolutely straight line, parallel with the axis of the limb, and the imbrication be as faultless to the eye as it can hardly fail to be uncomfortable to the patient. Regard for appearances is sometimes carried so far that the sight of a raw edge is not tolerated; the pupil is required to turn such an edge in order to hide it from view, no regard whatever being paid to the fact that the necessary folding must make the pressure upon the limb uneven. Thus a "finicky" adoration of set rules leads at times to defeat of the purpose for which a bandage is applied.

It seems to us that some of the ornate bandages of our forefathers might, with advantage, be dropped from the text-books, as they have virtually been dropped from practice. One is the capeline bandage, beautiful to look upon even when incorrectly depicted, as it usually is, but practically almost useless. Another is the stitched form of the many-tailed bandage, and still another is that variety made by tearing a broad piece of muslin into strips from either end, the central portion being left intact to obstruct, if not wholly prevent, the proper overlapping of the turns. Properly made of independent strips any one of them removable and replacable without molestation of the injured limb, the Scultetus bandage is often exceedingly serviceable, but the forms that we have mentioned should, it seems to us, no longer figure in teaching the useful art of bandaging. Simplicity is what is wanted, even if zigzags have to be a trifle irregular and turns not scrupulously equidistant.—*New York Medical Journal.*




This envelope came through the mails from Arkansas to the Johnson & Johnson laboratories without a hitch, showing that Uncle Sam's mail men are well acquainted with the soap that doctors use to sterilize their hands.

## FROM THE MAIL BAG

The following are extracts from letters received by the editor:

Dr. J. J. Morin, 95 North Main Street, Rochester, N. H.—May I trouble you to send me ten copies of your pamphlet entitled "Hygiene in Maternity"? I have seen a copy and I believe it to be the best synopsis yet published for the use of expectant mothers."

---

R. F. Oliver, M.D., Warner, N. H.—I am much pleased with your Rubber Mesh Protective, also my patients, for they do not dread dressings when it is used.

---

D. F. Maher—I note the finger hold improvement to your Synol Soap bottle. It is O. K. In washing, the bottle can now be handled with ease and safety. It is an exceedingly useful improvement.

---

Estes Surgical Supply Company, Atlanta, Ga.—Though we are busy we must take time to drop you a line to congratulate you on the last issue of the Red Cross Notes. This, to our mind, is the best one that you have ever gotten out, as it carries information that is of real service to the physician.

# Ligatures of Absolute Sterility

**There is never any doubt about the sterility of catgut ligatures prepared in the Johnson & Johnson laboratories. Our tests, before the ligatures leave the laboratories, prove their sterility. The tests of leading surgeons, who embed millions of Red Cross ligatures in wounded tissue annually, prove their sterility.**

High Pressure Steam Sterilizer in use in Ligature Department of Johnson & Johnson.
Normal working capacity, 10,000 tubes

In the preparation of catgut ligatures there is immediate disinfection and cleansing of the raw intestines after they leave the lambs.

There is disinfection of each gut before it is twisted to make the strand.

No final confidence is placed in sterile handling. Everything in the ligature line is made sterile after closing. We do not depend on operatives keeping their hands and appliances sterile. We consider exposure to the air unsafe, however short such exposure may be.

The Bacteriological Laboratory is directly connected with our ligature department and directs the whole operation. Every step in the preparation is checked and no hit-or-miss methods are tolerated.

Our results show absolute sterility, not merely an aseptic condition or probable sterility of the ligatures.

JOHNSON & JOHNSON

New Brunswick, New Jersey, U. S. A.

TON MEDI
JUN 12

656

# War Surgery Issue

Series VII

Number Nine

# RED CROSS NOTES

PUBLISHED BY

Johnson & Johnson

NEW BRUNSWICK, N. J., U.S.A.

Copyright 1918, Johnson & Johnson

"SOMEWHERE IN FRANCE"

King George Frequently Visits the Field Hospitals, Speaks Words of Comfort and Cheer to the Fallen Heroes and Pays Tribute to the Modern Science of Surgery

Since America's entrance into the war, the mammoth electric sign at the Johnson & Johnson laboratories at New Brunswick, N. J., has been used to flash patriotic messages to the public. It has helped in the Liberty Bond campaigns, the Red Cross campaigns, the Food Conservation campaign and all of the other campaigns connected with the war. Here is shown the message flashed during the Food Conservation campaign, a display which called forth a letter of commendation from Herbert Hoover. As the sign is about one hundred feet long, it can be seen from a great distance.

# The Task—To Win the War

Just at present the mightiest task before the American people is that of winning the war. Personal interests, community wants, State desires and ordinary National needs must become subservient. It is a task which calls for the best in every person.

It is inspiring to know that the members of the medical profession are in the fore ranks of every movement organized to help win the war. Thousands and thousands of doctors have entered the service of the government, have gone to France with our army, have gone to the training camps and to the cantonments, have aided in the organization of the Selective Army. They are giving their time freely and willingly. They know the seriousness of this task.

Johnson & Johnson are proud of the privilege of fighting shoulder to shoulder with these medical men. We, too, know the demands of war. Our defenders must have the best surgical dressings that science can produce. We are supplying them. When the battlefields give forth new teachings of surgery that will benefit all mankind, the way must be made easy for their general adoption. We are showing the way. When campaigns are organized to raise money for the war's prosecution, or for the welfare of the soldiers, or for the education of the public along lines of food conservation and thrift, men and support must be given to them. We consider this a privilege.

Service to America is the big underlying principle which governs all acts at the Johnson & Johnson laboratories these days, and it is not an impersonal service. Floating from one of our buildings is a service flag with thirty-five stars. We have an intense personal interest in this great task of winning the war.

# Carrel's Technique to Benefit All Mankind

## The Carrel Method of Wound Sterilization Had Its Origin in Military Needs, But It Has Been Extended to Civilian Practice and Will Stand as War's Greatest Gift to Surgery

When Dr. Alexis Carrel taught the French army surgeons how to minimize the number of amputations and to get their wounded soldiers back into the fighting ranks quickly, he performed a service to all mankind. Already the Carrel method of wound sterilization has been extended to civilian practice and is in use in a rapidly increasing number of hospitals in the United States and elsewhere. In this method is seen the possibility of a great saving of life and limb in the treatment of industrial accidents.

The new principle involved in this method of wound treatment is the gradual but complete sterilization of the wound by intermittent saturation by means of a specially devised solution of sodium hypochlorite.

Dr. Alexis Carrel

In the writings of Carrel himself and in numerous articles appearing in medical and surgical literature the principles involved and the method of application of the solution have been discussed. (A partial list of such literature appears elsewhere in this number.) It is from these articles that the following statements are made.

The essential features of the technique as applied to cases within the first twenty-four hours after the infliction of the wound—that is, the period before the onset of the characteristic phenomena of inflammation—are the excision of the walls of the wound and the irrigation of the wounded area by the hypochlorite solution until the microscopical examinations of the secretions show that the number of organisms has been reduced practically to the vanishing point, and finally, when the sterilization has been attained, closure of the wound by suture.

Apart from the technique devised by Carrel and the bacteriological control, the novelty of the method lies in the assembled rather than in the individual procedure. Carrel emphasizes the point that the use of sodium hypochlorite as a safe antiseptic in contact with the living tissues depends upon its adjustment. Alkaline solutions such as those of Javelle or Labarraque are harmful; a weak solution is useless, and one above a certain standard is dangerous.

Carrel has worked out a system for the uniform distribution of the antiseptic to the entire wound by means of what are known as the Carrel Tubes. Very great importance is attached to the renewal of the fluid at short intervals. If the treatment is begun in the pre-suppurative stage the wound can be steril-

ized in from three to ten days, and a compound fracture in from ten to fifteen days or more. When suppuration has already set in the time required for sterilization is somewhat greater.

A valuable feature of the method is the bacteriological control, since a wound clinically healthy may yet harbor a sufficient number of organisms to prevent healing by first intention when the surfaces are brought together, but when in the case of a wound treated from the outside by this method, microscopic examination shows a practical sterility of the surface for two or three days, closure may then be safely practiced.

When there has been suppuration it is advisable to wait longer—up to eight days. The principle followed is to wait until the tissues have formulated a granular layer under the continued influence of the antiseptic, which in itself does not hinder the process of repair, and then after the organisms have been practically eliminated to bring the surface into apposition.

As opposed to preliminary suture immediately after excision of a recent wound, Carrel's method seeks to avoid accidental infection by virulent organisms in unprotected tissues where they may be capable of causing more serious effects. On the whole the following summary of the method seems justified.

It is believed that the Carrel method opens a new and hitherto unknown field to surgery. By means of this technique many amputations can be avoided and much suffering prevented. Uncertainty and doubt as to the best procedure on the part of the surgeon is removed. He need no longer be compelled to decide at once whether to amputate or run the risk of general infection or of gangrene. Serious compound fractures, infected joints or abscesses, for instance, may safely be treated by this method with entire assurance that the surgeon can produce a sterile wound and can maintain it in that condition indefinitely or until circumstances, in his opinion, warrant closure of the wound.

## Dakin Solution—Real and Unreal

It is notable the number of mixtures which have been put together and labeled "Dakin Solution." In the medical and pharmaceutical press formulas without number have been printed. For the most part the authors seem to take it for granted that all that is required is to supply a solution of bleaching powder made alkaline. Carrel has emphatically called attention to these errors. He states:

"Experience has shown us, however, that in the various hospitals where the Dakin solution is said to have been in use, they often employ under this name various mixtures, more or less dangerous. These defective solutions, which irritate the tissues and do not sterilize the wound, are the result of more or less clumsy faults in the technique. The worst error consists in attributing to Javelle Water or Labarraque's Solution mixed with a certain proportion of boric acid the properties possessed by the Dakin solution. Other errors creep up when the hypochlorite of soda solution is prepared according to Dakin's method but by the use of chloride of lime in which the active content of chlorin is not known. Errors in the mode of preparation result in solutions which are irritating because they contain too much hypochlorite of soda, or which fail to sterilize the wound because the amount of hypochlorite of soda is too small, or which do not keep because they are charged with too much boric acid.

"Errors in the strength of the solution also occur. In certain hospitals we have seen the solution used where the hypochlorite content was correct but whose strength was reduced by the use of water. Solutions thus obtained have a bacteriological potency far too feeble and they must not be used. It has been determined that a solution varying from 0.45% to 0.50% has no irritating action on the tissues when used according to the method described. There is no danger when the Dakin solution pure and simple is accurately prepared. The procedure for sterilization has been calculated with a view to the application of a liquid possessing the strength and qualities of Dakin's solution, so any alteration of the solution robs it of its efficiency."

Dr. Fred H. Albee, who made a study of the Carrel-Dakin method of wound sterilization in France, states:

"Unless a surgeon attempting this method is somewhat of a chemist himself, or is as fortunate as Carrel himself in having at his disposal a competent chemist to assay, titrate, and neutralize the solution as made, and to test any bleaching powder used in preparing the solution, he is sure to have the same unsatisfactory experiences that many of the hospitals in France passed through when they first began to employ this method.

"Bleaching lime is a commercial product and varies in wide limits in its chemical content, it is very unstable and varies in its active chlorin content from 15% to 37%. Again, sodium bicarbonate usually obtained in this country is composed largely of sodium carbonate and therefore is not useful in neutralizing caustic alkali. Here another difficulty and uncertainty arises. One needs to only read over carefully the directions drawn up by Carrel to realize the complicated process necessary to prepare the solution so it will always be just right. To avoid the above difficulties it has occurred to the author that if expert chemical work is necessary in the preparation of this solution it could far better be done by reliable manufacturing chemists and prepared in large quantities before it reaches the surgeon. The preparation when ready for use is unstable and therefore cannot be put up in tablet form, or as far as that is concerned, in any other complete form because chemical changes take place and the preparation loses its potency.

"The discoverer's method for making up the solution was based on the use of bleaching powder (calcium hypochlorite) as the source of chlorin. This was combined with sodium carbonate and bicarbonate to form the so-called Carrel-Dakin solution. As has been stated, 'in order to prepare the Carrel-Dakin solution of a satisfactory strength it requires practically fifteen hours of time and the services of a chemist.'"

The process originally devised suffered from inherent drawbacks impossible to overcome under ordinary conditions in the hospital or surgical practice. All hypochlorites, and especially the bleaching powder of commerce, are very unstable, deterioration takes place on exposure to the light, heat, air, moisture, rust, etc., rendering their use extremely difficult for such a complicated purpose as surgery. As a consequence wherever the Carrel-Dakin method was attempted it was necessary to test its strength by careful assay at the time it was prepared—the process necessitated the most careful manipulations by a skilled chemist.

Realizing that the exceptional conditions required for making this solution were not available to many hospitals and practitioners, Johnson & Johnson have met the situation by preparing the Carrel-Dakin Solution in a way that is practical and useful under all conditions.

# Making the Carrel-Dakin Solution

## Chlorin-Soda Ampoules, Johnson & Johnson, Give Surgery an Improved Method of Making the Solution of Sodium-Hypochlorite, or Standard Carrel-Dakin Solution

The Johnson & Johnson method of preparing the Carrel-Dakin solution takes advantage of the use of liquid chlorin, which is a chemically pure chlorin in its anhydrous form, compressed and liquefied. It is a clear liquid (pure chlorin) which will not change or deteriorate under the influence of light or heat, no matter how long it may be kept in storage.

From every angle this substance presents radical changes over the bleaching powder heretofore used. In using liquid chlorin the instability and the uncertainty to which the bleaching powder is heir are at once avoided.

Under the Johnson & Johnson method the liquid chlorin is supplied in sealed glass ampoules (under process patent applied for by the Electro Bleaching Gas Company, of New York), the sodium salts are supplied in a tube in the exact quantity to prepare a definite measure of the solution (one liter).

The Johnson & Johnson method in a few seconds gives the Carrel-Dakin antiseptic solution of the standard strength of between 0.45% and 0.50% sodium hypochlorite, free from caustic alkali. All settling, decantation, filtering and other manipulations to eliminate the lime sludge are obviated and the solution is exact and definite. All the difficulties of and the necessity for an analytical test are obviated.

The method is at once adaptable to hospital and field use as well as to ordinary office practice.

This method of making the Carrel-Dakin solution consists of, first, placing one liter of water in a glass bottle of not less than two liters capacity, and dissolving therein the soda from the ampoule supplied by Johnson & Johnson. The bottle is then shaken in order to dissolve the soda completely. Secondly, the ampoule of compressed liquid chlorin is inserted in the bottle by means of a special arrangement called an ampoule holder; the bottle is covered with a canvas bag and shaken violently. This procedure breaks open the tip of the chlorin tube, allowing the escape of compressed chlorin gas into the bottle, where it almost instantly dissolves in the soda solution. The result of this reaction is a perfectly clear, transparent Carrel-Dakin hypochlorite solution of exact strength and in proper condition for use in wound sterilization, hence the solution requires no testing of any kind nor any titration.

Inquiries have reached us as to the chemical conditions surrounding this reaction, and the characteristics, both chemical and physiological, of the resultant solution. As the matter is one of interest it is herewith stated.

When chlorin gas is dissolved in a solution of carbonate of soda, there are produced three distinct chemicals:

First—Hypochlorite of soda, which is the active ingredient sought for in this case.

Second—Sodium chloride.

Third—Sodium bicarbonate.

The chemical formula illustrating this reaction in exact detail is given at the top of the next page.

Note that when this reaction takes place in one liter of water 5 gms. of sodium hypochlorite are formed—giving the exact strength of 0.50 per cent. hypo-

Johnson & Johnson Chlorin-Soda Ampoule method of preparing hypochlorite solution for Carrel-Dakin method of wound-disinfection, 4.8 gms. chlorin, 21.3 gms. sodium carbonate (monohydrated). The reaction between chlorin and sodium carbonate in one liter of water is:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $2Na_2CO_3-H_2O$ | + | $Cl_2$ | equals | NaClO | + | NaCl | + | $2NaHCO_3+H_2O$ |
| Monohydrated Sodium Carbonate 16.8 gms. used | | Chlorin 4.8 gms used | | Sodium Hypochlorite 5. gms. produced | | Sodium Chloride 4.0 gms. produced | | Sodium Bicarbonate 11.4 gms. produced |

From this formula it will be seen that the reaction produces sodium hypochlorite, sodium chloride and sodium bicarbonate, which together with 4.5 gms. excess sodium carbonate supplied in J & J ampoules, produce a mixture identical with that made by the Carrel-Dakin formula, using chlorinated lime, sodium carbonate and bicarbonate.

chlorite required. Also the solution will give no red color with phenolphthalein powder—showing its entire freedom from caustic alkali as required.

It will be seen from this that theoretically the resulting solution should have exactly the same physiological effect as is the case with Carrel-Dakin solution made from chlorinated lime according to Carrel's original directions.

The thorough tests of this solution by qualified experts have shown evidence that the material produced by the Johnson & Johnson Chlorin-Soda Ampoules fulfils the theoretical conditions and is equal to or perhaps superior to that produced by the older method from chlorinated lime.

Besides clinical experience in the use of this material, studies have been made with a view of determining the active qualifications of it in comparison with the solution made from the lime compound. Perhaps the most striking and valuable feature of the Carrel-Dakin hypochlorite solution is the solvent power which it has for dead tissue. Carrel, Sherman and others point out three distinct features to which attention must be called when a discussion is entered into about this subject:

*First*—The Carrel-Dakin Solution must be of definite strength in regard to its chlorin component; that is to say, between .45 and .50 per cent. sodium hypochlorite.

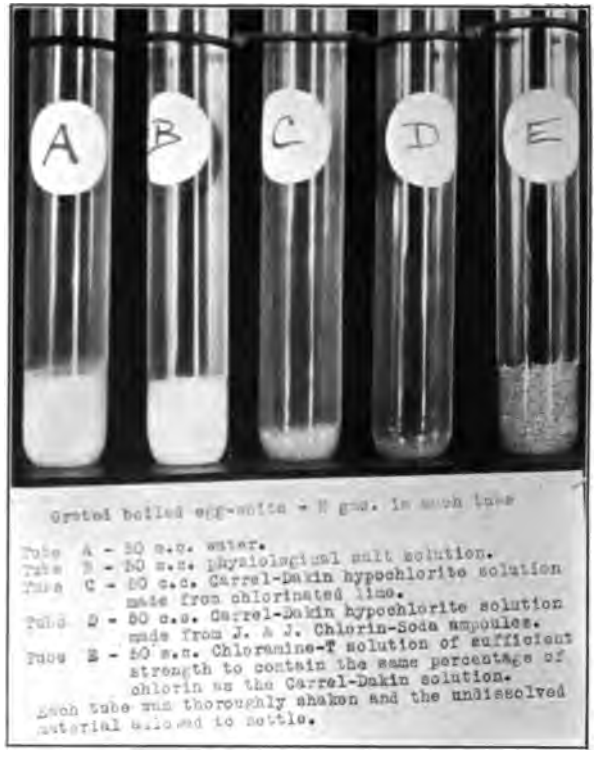
*Second*—The solution must be absolutely free from caustic alkali as indicated by no red color being produced when a little powdered phenolphthalein is thrown on the surface of the solution.

*Third*—Not only should this solution be of exact chlorin strength and free from alkali, but it also has another power of great advantage in application to many wounds, especially those which have been neglected. This is its power to dissolve away dead tissue, thus constantly exposing deeper infections and clearing up the area irrigated.

It is very highly important clearly to understand that the Carrel-Dakin hypochlorite solution has a distinct solvent effect, and that this is one of the most important points of superiority of this solution over any of the later developments along the line of organic chlorin compounds.

It must also be apparent that there is no hit-or-miss luck about this matter, but that such solvent power is due to the character of the solution. Sodium chloride itself, when used as the well known physiological salt solution, has some power of this sort, and therefore the Johnson & Johnson laboratories have made a number of experiments with different substances for the purpose of illustrating distinctly the solvent power of various solutions on dead tissue.

The illustration herewith presented, we think, is a very striking picture of the relative values of various irrigating and disinfecting solutions as compared with water. The descriptive matter under the




Grated boiled egg-white = 2 gms. in each tube

Tube A - 50 c.c. water.
Tube B - 50 c.c. physiological salt solution.
Tube C - 50 c.c. Carrel-Dakin hypochlorite solution made from chlorinated lime.
Tube D - 50 c.c. Carrel-Dakin hypochlorite solution made from J. & J. Chlorin-Soda ampoules.
Tube E - 50 c.c. Chloramine-T solution of sufficient strength to contain the same percentage of chlorin as the Carrel-Dakin solution.

Each tube was thoroughly shaken and the undissolved material allowed to settle.

cut itself leaves little to be desired in the way of an explanation, and we think will be clear to any one reading it carefully.

It will be noticed at once that the dissolving power of Carrel-Dakin hypochlorite solution made from Johnson & Johnson's Chlorin-Soda Ampoules is equal to and probably slightly superior to that made by the older method.

There is nothing freakish or unusual about this experiment and it may be reproduced by any chemist or physician. A hen's egg boiled for fifteen minutes and the white separated and pressed through a forty-mesh sieve gives the product necessary for the experiment, and it should be immediately weighed out and with as little air exposure as possible, transferred to the test tubes.

In regard to the keeping qualities of the solution, when made from Chlorin-Soda Ampoules, we are in a position to state that it apparently is exactly the same as hypochlorite solution made from chloride of lime, with a slight advantage, if any, in favor of the Liquid Chlorin mixture. The keeping qualities of Carrel-Dakin hypochlorite solution, by whatever method produced, are influenced chiefly by the temperature. In a warm place deterioration is quite rapid. The solution should be kept in well-filled, tightly stoppered bottles, and in a cool, dark place. Under these conditions it can probably be kept for three or four weeks, without becoming weakened to such an extent that it is below 0.45%—the minimum strength allowed.

# Results Observed at Compiegne

## The Sterilization of Wounds by the Carrel Technique, as Observed at a War Hospital in France and Recorded in the Writings of Carrel and Dehelly

(From the Writings of Carrel and Dehelly)

Sterilization of a wound comes to pass in a different manner according as it is recent or old-standing and is associated or not with fracture.

*Wounds of the Soft Parts*—From the month of December, 1915, the date when the technique was first employed under its actual form as at present, all wounds of the soft parts have attained surgical asepsis. They were subjected to secondary suture, with the exception of those which were very small and healed spontaneously, and those which were accompanied by so great a loss of substance that they could not be closed. Wounds, fresh, phlegmonous, gangrenous, suppurating, all were equally capable of disinfection, but the rapidity of the sterilization depended in a certain measure on the state of the infection.

*Fresh Wounds*—When the treatment of wounds was commenced from five to twenty-four hours after the injury, sterilization was rapidly produced. Generally microbes disappeared from the fifth to the twelfth day if the wounds contained no gangrenous tissue.

*Phlegmonous and Gangrenous Wounds*—Cases arriving later at the hospital, with wounds already bearing evidence of phlegmon or gangrene, were treated in a similar manner. After the disappearance of serious infection, many injuries could be sutured.

*Suppurating Wounds*—Wounds which are already suppurating when brought under treatment are readily disinfected. Surface wounds, even when suppuration is abundant, are sterilized in a few days. Usually, when a granulated wound is washed with neutral oleate of soda and treated either with hypochlorite or chloramine paste, microbes disappear completely from the smears in two or three days.

It is the same with abscess cavities. When a tube is placed in the cavity of an abscess, and the liquid can reach every portion of the surface of the walls, sterilization takes place with great rapidity. Then, by a compression dressing, the walls can be brought together and the cavity obliterated in a very short time. When the wound is deep and irregular, and contains necrotic tissue, sterilization is attained more slowly.

We may, therefore, say that all wounds of soft parts respond to treatment by becoming sterile. About ninety per cent. of both fresh and suppurating wounds were closed before the twentieth day. The tests were disinfected at a slower rate, but all attained surgical asepsis.

*Fractures*—Since the month of December, 1915, we have succeeded in sterilizing, in a satisfactory manner, from the surgical point of view, all compound fractures of the smaller bones, short bones and flat bones, which arrived at the hospital from five to twenty-four hours after the infliction of the injury, with the exception of fractures of the jaw communicating with the mouth. In the greater number of cases fractures of metacarpus and metatarsus, deep wounds of ankle or wrist with laying open of several articulations, have been closed. Fractures of the patella have yielded similar results. We may conclude that these fractures from the sterilization point of view behave like wounds of the soft parts. In the majority of cases, sterilization of fractures of the humerus, tibia and femur has been obtained.

*Fractures Accompanied by Wounds of Joints*—When a wound was associated with the opening of an articulation, results differing according to the region were observed. When the lesion was limited to synovial membranes or to the edges of the articular condyles, arthrotomy followed by disinfection of the seat of fracture permitted the osseous extremities to be retained. Often functional integrity remained complete. The scope of simple arthrotomy could be enlarged, and the number of resections diminished.

In the cases of deeper osseous lesions and more extensive fracture of the articular condyles, we have also been able to avoid resection, and to preserve all the movements of the articulation.

CONSEQUENCES OF THE STERILIZATION

The suppression of suppuration and infection in the majority of wounds has important consequences for the patient, since it diminishes to a very large extent the local and general complications of wounds, and consequently the length of treatment and degrees of final incapacity.

*Diminution of the Frequency and Intensity of General Complications*—The rapid sterilization of wounds nearly always protects patients from those complications which lead to death.

The general condition of the cases whose wounds are in a fair way to become sterilized is habitually good, even when the temperature is more or less elevated. This phenomenon was exhibited in a striking manner by those cases which were brought to the hospital with injuries of long standing and freely suppurating. Immediately the suppuration disappeared clinically, the general aspect of the patient changed. The first effect of the cleansing of wounds was always marked improvement in the general condition.

*Diminution in the Number of Amputations*—The suppression of infection has permitted us to escape the lymphangitis, abscesses, and purulent tracks which usually accompany infected fractures and joint-injuries.

In cases where the extent and complexity of the lesions do not permit rapid sterilization, the destruction of the greater quantity of the microbes and gangrenous tissue immediately produced considerable local amelioration. From this resulted the possibility of preserving limbs which presented very extensive lesions, or of performing conservative operations instead of carrying out radical treatment.

Amputations have been able to be reduced to the cases in which the crushing of almost the whole of the portion of the skeleton concerned, or the destruction of the vasculo-nervous supply, rendered impossible the conservation of the limb.

The sterilization of wounds, therefore, permits of the preservation of nearly all limbs which are not rendered useless by the extent of destruction of osseous, vascular or nervous elements.

The possibility of disinfecting injuries lessens the number of amputations in a very great proportion, since this operation today in 70 per cent. of the cases is caused by septic sequelae.

*Diminution of Length and Cost of Treatment*—The length of time treatment has to be carried on has been lessened because wounds have been rapidly closed and because repair of bone, muscle, and nerve has been effected at an early stage.

*Influence of Secondary Closure on Duration of Treatment*—Wounds of the soft parts, both fresh and suppurating, were closed in the proportion of 90 per cent. from the fifth to the twentieth day, in whatever stage of the wound the treatment may have been commenced. Wounds not sutured in this period were

also sterilized, though in a slower manner. If the wounds thus closed during the first twenty days of treatment had been treated by the usual methods, they would have needed from one to six months to cicatrize. By early suture a diminution of about two-thirds of the duration of treatment is obtained.

In compound fractures of flat bones, short bones, and long bones such as the fibula, radius and ulna, sterilization comes about as quickly as in the wounds of soft parts. The saving in the length of time needed for treatment was, therefore, very considerable, because these compound fractures, treated in the ordinary way, often suppurated for several months. It is well known how slowly deep wounds of the tarsus, for example, recover when they are infected. One cannot estimate exactly the diminution produced by sterilization in injuries of the humerus, tibia and femur. But this diminution is considerable. In fact, compound fractures of the humerus, when sterilized, are often closed after the lapse of from twelve to twenty days, when similar cases treated by the ordinary methods are still suppurating after six, seven or eight months. It is also evident that the closure of compound fractures of the femur after fifteen, twenty or twenty-five days constitutes a great advance.

*Influence of Early Anatomical Repairs on the Duration of Treatment*—Sterilization of the wound allows us to practice operations quite early in the case which formerly had to be put off until after cicatrization was complete. In this manner bone-grafting or wiring, reunion of muscle or tendon, nerve suture, before today could only be practiced after the healing of the infected wound. This cicatrization often was only obtained after the lapse of several months. Today we set about these constructions as soon as the wound is sterile—from the eighth to the fifteenth day.

*Diminution of the Cost of Treatment*—The expenses of treatment are considerably lessened, since its length is so much less than by other methods. The saving thus realized is from about 50 to 70 per cent. Besides, the substances used in the treatment are not costly.

*Diminution of Positive Incapacity*—In the greater number of injuries, definite incapacity is the result of infection. As the sterilization of wounds permits the avoidance in many cases of amputations and resections, there results a considerable diminution in the amount of pensions payable to the wounded men.

### Practical Value of the Method

The results observed at Compiégne showed us that suppuration of wounds can be suppressed, and that the majority of wounds are capable of being sterilized and sutured.

### Conclusions

Since our methods have been employed with success under the ordinary conditions of "ambulances" and hospitals, the sterilization of both fresh and suppurating wounds ought to be practiced almost everywhere. But surgeons should not forget that all the details of the method have been studied experimentally and established in a certain way to produce a certain result. Neither the preparation of Dakin's solution may be modified, nor the processes for mechanical and chemical cleansing of wounds.

But we can be quite sure that, applied in their entirety, the methods just described will produce the desired results. Admitted, their use exacts more precision and more care than old methods, for any approach towards technical perfection requires more elaborate apparatus and a more specialized staff. But efforts of no great magnitude on the part of doctors and nurses will most certainly yield an immense improvement in results.

# The Use of the Carrel-Dakin Solution in Mouth Surgery

(Abstract from a paper by H. M. Beck, D.D.S., "Dental Cosmos," October, 1917.)

The author states that after an investigation he was led to adopt the Carrel-Dakin solution in all surgical cases to the exclusion of other drugs including iodine. He states the Dakin solution is so much more efficient, less irritating and less toxic than any antiseptic we ever used that we feel justified in publishing the results of our investigations, with the hope that others will try it intelligently and scientifically, and report the results of their investigations.

*Use of the Solution in Pyorrhea*: One of the diagnostic signs of pyorrhea is inflamed, bleeding gums about the necks of the teeth. Often the inflammation is so marked and the bleeding so excessive that thorough prophylactic treatment is almost impossible. To overcome this condition, have the patient rinse the mouth every four hours with Dakin's solution for two days before presenting himself for the prophylactic treatment. The operator will find, after two days' treatment with Dakin's solution, that most of the inflammation and bleeding has subsided, and that the heretofore painful scaling and polishing of the teeth can be effected with little or no pain. After the prophylactic treatment use the solution in a glass syringe with a platinum needle. If the solution reaches the point of infection without being diluted with saliva the flow of pus will stop in a few hours. If the pus persists, the solution has not reached the seat of infection and the treatment should be continued. In extreme cases of pyorrhea, where very large and deep pockets are found, we have used the following treatment with most gratifying results: First, the pocket and surrounding tissue is walled off with cotton rolls and kept as dry as possible. Then a small pellet of cotton is saturated with Dakin's solution and inserted into the pocket, packing it about the neck of the tooth and well down into the pocket.

Caution: The packing should not be tight. This dressing should be changed every four hours for two days, and usually the flow of pus will cease in two or three treatments. If the flow of pus stops, the cotton dressing should be omitted, but the pocket should be flushed out with the solution for three or four days. In several bad cases, where it seemed impossible to reach the point of infection with Dakin's solution, we have inserted a fine wire into the pocket, made a radiograph to ascertain the location and depth of the pocket, and with this help have succeeded in getting Dakin's solution to the seat of infection and have been able to arrest the flow of pus.

*Treatment Following Root Amputation*: Spray the wound every two hours with Dakin's solution. Use no other drug or treatment, and the results will be all that could be desired. Caution: Do not use more than 10 lb. pressure in the atomizer; a spray forced into a wound of inflamed tissue with 25 lb. or 30 lb. pressure is most injurious.

*Method of Disinfecting the Mucous Membrane Before Hypodermic Injections or Novocaine-Suprarenin*: In conductive anesthesia or in local injections, spray the mouth first with Dakin's solution, and after a few minutes wipe off the mucous membrane with 70 per cent. alcohol about the area where the needle is to be inserted. Just before injection, again wipe the point of insertion with Dakin's solution. Caution: Do not scrub the part to be disinfected with Dakin's solution—simply wipe it off, and do not use Dakin's solution immediately before or after using iodine.

Dr. Carrel's Portable Field Hospital at New York. Bellevue Hospital is shown in the background

## Carrel Teaches U. S. Army Surgeons

In a hospital built by the Rockefeller Institute for Medical Research as a model for American base hospitals, Dr. Alexis Carrel has been demonstrating to American army and civil surgeons the technique of the Carrel-Dakin method of antiseptic irrigation of wounds.

The hospital, which combines the best results of the experience of hospital work on all the allied fronts, is located at Avenue A and Sixty-fourth Street, New York. It is of knock-down construction and can be taken apart and made ready for shipment in forty-eight hours. It is designed throughout as base hospitals are designed in France, with the exception that the problem was made slightly easier by the fact that water and sewage problems solved themselves in the city.

The only departure from the war hospital plan is a lecture room in the laboratory building. Here Dr. Carrel addresses the physicians and surgeons.

---

### Treatment of Acute Mastoiditis

Mahn relates that irrigating and draining according to Carrel's technique shortened the course of treatment by two-thirds in his experience. It is a kind of bridge between the old methods of treatment and closing the wound at once after the operation, thus interposing a useful and prudent period of watchful waiting before definitely suturing the wound.

One or two teaspoonfuls of the Dakin fluid are used in the irrigation every two hours, under a pressure of 60 or 80. He changes the dressings every day, and each time examines a specimen of the discharge first dried and stained with phenolized thionin 1:1,000. When the germs in the discharge are reduced to an average of one to the microscopic field, he thinks it is safe to suture.—*Paris Medical Journal,* April 14, VIII, No. 15, pp. 293-308.

# Red Cross Notes

## Supplies for the Carrel Treatment

**The apparatus used in the Carrel method of wound sterilization has been described at some length in surgical and other journals. Operators have suggested certain modifications. Carrel himself has made minor changes since the introduction of the method.**

holes for a distance of two or three inches.

In cavities the rubber instillation tubes are used bare; for surface wounds the tubes are covered with Turkish toweling, or diffusers, to secure even distribution of the fluid.

**A package of Chlorin-Soda Ampoules, containing three ampoules of liquid chlorin and three tubes of sodium salts, sufficient for three liters of the Carrel-Dakin solution. Upon the top of the case is shown an unwrapped ampoule and tube of soda salts.**

Carrel emphasizes the point that this is not "an irrigation process under the older meaning of the term," but is "an instillation, continuous or intermittent application of an antiseptic by means of small rubber tubes into all recesses of the wound."

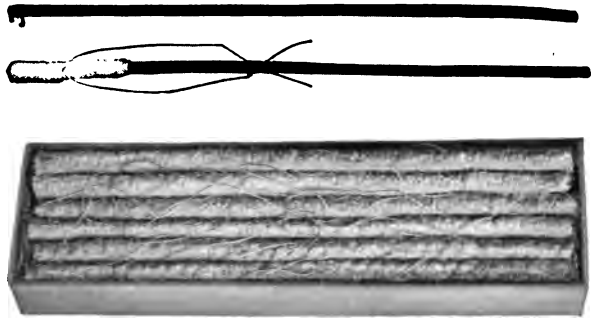
The paraphernalia for the process, as supplied by several houses, consists of a reservoir of a capacity of about a liter. To this is attached a rubber tube with a pinch cock. Attached to the end of the rubber tube is a glass distributing tube, which in turn is connected with the conducting or instillation tubes. The glass distributing tube is made so as to connect one or more instillation tubes. The instillation tubes are of rubber, are tied at the ends and are perforated with fine

The solution has been instilled by means of a syringe, but Carrel now only uses a syringe to test the permeability of the tubes during the manipulation of the dressing.

Johnson & Johnson do not supply the apparatus, except as to the parts noted below. The apparatus, in whole or in part, may be purchased from the leading instrument houses.

Following is a list of supplies for the Carrel method which are made by Johnson & Johnson:

CHLORIN-SODA AMPOULES—One ampoule of liquid chlorin and one tube of sodium salts contain the exact amount of material necessary to prepare one liter of Carrel-Dakin solution of standard strength—.45% to .50% sodium hypochlorite. These items are supplied only in sets containing three ampoules of liquid chlorin and three tubes of sodium salts (sufficient for three liters of Carrel-Dakin solution). Price, per set, $1.25.



The top cut shows two instillation tubes with perforated areas. The lower tube is covered with a diffuser made of Turkish toweling. The lower cut shows a box of diffusers made of Turkish toweling ready for application to perforated tubes. The strings are for the convenient application of the tube.

AMPOULE HOLDER—(Connected with rubber stopper) For holding the chlorin ampoule in the bottle when making the solution. Price, per dozen, $2.00.

PROTECTIVE BAGS—To cover five pint or half-gallon bottles, to protect user in case of breakage of glass bottle. Price, per dozen, $2.40.

C. D. S. RUBBER INSTILLATION TUBES—These are perforated, ends tied, and the perforated area covered with special absorbent Turkish toweling made for the purpose. Packed six in a box. Price, per box, $1.50.

RUBBER INSTILLATION TUBES (plain)—Perforated and ends tied but not provided with diffusers. Packed one dozen in a box. Price, per box, $1.50.

DIFFUSERS—Made of special Turkish toweling manufactured for the purpose. Prepared in "tubes" twelve inches long, ready for application to perforated instillation tubes. These are extra diffusers to replace those removed by the surgeon and destroyed after each daily change of dressings. Packed one dozen in a box with a glass applicator to facilitate slipping them over the rubber diffusers. Price, per box, $1.00.

The Ampoule Holder, for holding the Chlorin ampoules in the bottle when making the Carrel-Dakin solution.

BACTERIAL CHARTS—As designed by Dr. Carrel for charting the bacterial "count" by which the point of approximate sterility is determined. No charge.

## Literature of the Carrel Method

The following is a list of the more important articles which have appeared in reference to the Carrel method of wound sterilization. It is here printed to assist those who may desire to further investigate the subject:

SANER, F. D. The Treatment of Wounds (Carrel-Dakin method). Guy's Hosp. Gaz., Lond., 1917, xxxi, 44-48.

A paper which eulogizes and describes the technique of treatment of wounds and bone injuries in the Lycee Pasteur Buffon, Paris, by Dr. Chutro, who uses the Carrel-Dakin method. He, however, adopts a different bacteriological routine. Dr. Chutro's success has been remarkable, says the writer. Since Jan. 1, 1916, he has had to perform but three amputations, and they were unavoidable on account of tuberculous or other complications.

SANER, F. D., and DEAN, C. The Carrel Method of Wound Treatment. A visit to the Carrel Ambulance. Guy's Hosp. Gaz., Lond., 1917, xxxi, 24-28.

Describes the technique of sterilization as carried out by use of Dakin's solution and the Carrel tubes.

NOLAND, L. The Carrel Method of Wound Sterilization. South. Med. J., Birmingham, Ala., 1916, ix, 1056-1062.

Describes the conditions existing in England and France in the hospitals as he saw them personally. The greatest problem which the surgeons have to face is that of infection. About 90 to 95 per cent. of all wounded admitted to base hospitals are infected. The number of amputations in both England and France is terrific. Gives a history and description of the Carrel-Dakin method of wound sterilization, as he saw it carried out in France.

LYLE, H. H. M. Disinfection of War Wounds by the Carrel Method as Carried Out in an

Ambulance at the Front. Med. Rec., N. Y., 1916, xc, 791.

Describes and illustrates the technique of the Carrel method, with the apparatus needed.

SHERMAN, W. O'N. The Carrel Method of Wound Sterilization. Surg. Gynec. and Obst., Chicago, 1917, xxiv, 255-274.

The most comprehensive and complete description of the Carrel-Dakin method published in the American journals. It describes the method, technique, composition of the Dakin solution and the Carrel apparatus for the administration of the solution, also statistics, cases and illustrations showing results, etc.

W., (H. C.) The Carrel-Dakin Method of Wound Sterilization. Colorado Med., Denver, 1917, xiv, 96.

Refers to the numerous papers in medical journals on the Carrel-Dakin treatment, especially the paper by Dr. Wm. O'Neill Sherman. The paper speaks of the difficulty of making the Dakin solution, and gives a list of "Don'ts" to be observed in regard to it.

DE NANCREDE, C. B. G., and KRAFT, R. W. Remarks and Clinical Reports on the Use of Dakin's solution. J. Mich. M. Soc., Grand Rapids, 1916, xv, 314-317.

A clinical address, gives briefly the reports of five cases. While acknowledging the rapidity with which pus is diminished with the Dakin solution, he nevertheless is personally skeptical as to the part played by chemicals in wound treatment.

DR. BARRETT, M.T. The Dakin-Carrel Antiseptic Solution. Dental Cosmos, Phila., 1917, lix, 446-448.

Recites some experiments he made with the Dakin solution in the treatment of pyorrhea and met with good results. He then speculates as to what influence the free chlorin might have on the calcium of the tooth structure, gold fillings, etc.

GOODNOW, MINNIE. The Carrel Tube for Wet Dressing. Trained Nurse, etc., N. Y., 1917, lviii, 87.

Brief description of the method of using the Carrel tubes in the war zone for keeping dressings continuously wet. Speaks briefly of the treatment of gangrene; also a few points as to dressing of septic wounds.

CARREL on the Treatment of Wounds. Mil. Surgeon, Wash., D. C., 1917, xl, 479-485.

Brief address delivered by Dr. A. Carrel before the U. S. Army Med. School, Wash., D. C., in which he describes the evolution of the treatment of wounds and its progress from the beginning of the present war to the present time. He also describes the condition and methods employed in the various hospitals, the general organization for the care of the wounded near the lines. While more than 90 per cent. of the patients coming in from hospitals were infected it was found that by using proper technique wound infections can be almost entirely controlled and that pus can be eliminated completely from the hospitals.

CARREL (ALEXIS) and DEHELLY (G). Le Traitement des Plaies Infectees. 8 Paris, 1917. 177pp., 78 illus.

The most important contribution on wound treatment by the Carrel-Dakin method yet published. The book is well illustrated by diagrams and contains an explicit statement of the principles and results of the treatment. The essential features of the technique are fully set forth. Special emphasis is laid upon the details; according to the authors, even experienced surgeons require several weeks' experience in the method in order to become familiar with its working. All these essential details in connection with the Carrel tubes, as well as the application of the Dakin solution, are described fully. (A translation of this work is being published in this country. Hoeber.)

The Treatment of Infected Wounds; the Carrel-Dakin Method. Brit. M. J., Lond., 1917, I, 264, illus.

A review of the Carrel-Dakin method condensed from the 177 p. pamphlet by Carrel and Dehelly (see foregoing reference).

La Methode de Carrel Dans les Plaies de Guerre. J. de med. et de chir., Par., 1916, lxxxvii, 469-482.

An exhaustive article in which the author reviews the history of the growth of the Carrel treatment, gives a report relative to a series of 121 wounds treated by Carrel's method.

FIESSINGER, N., and MOIROUD, P. Etude Biologique de Deux Plaies Gangreneuses Traitées par la Methode Carrel-Dakin. Paris Med., 1916-17, xxi, 242-248.

A biological study of two cases of gangrenous wounds treated by the Carrel-Dakin method. Detailed reports of the cases are given in full from day to day, with various tables showing results of laboratory examination.

PIERUCCI, G. La Cura Delle Ferite di Guerre con l'Antisettico Carrel-Dakin. Gior. di Med. Mil., Roma, 1917, lxv, 49.

Brief paper in which the author comments favorably upon the Carrel-Dakin method of sterilization of wounds. He states that in 1,415 cases of wounds treated by him the results were eminently satisfactory.

CLERMONT. Treatment des Plaies par de Methode de Carrel. Presse Med., Par., 1916, xxiv, 180.

Comment on the favorable results obtained by use of the Carrel method.

GIBSON, CHAS. LANGDON. The Carrel Method of Treating Wounds. Annals of Surgery, Sept., 1917, 262-279.

Observations made during a visit to the Carrel and other hospitals in France, and his personal experience at the New York Hospital, with an epitome of Carrel and Dehelly's book.

RED CROSS NOTES, Series VII, No. 8—Johnson & Johnson, New Brunswick, N. J. Birth of a New Era in Surgery.

Technique of Carrel-Dakin method of wound sterilization; history of the method, with illustrations of use in Carrel's hospitals in France; observations on technique by various writers.


## For Busy Physicians

Busy physicians will find concise facts about blistering in "Blistering Time Table," a twenty-four page booklet issued by the Scientific Department of Johnson & Johnson. Among the chapters are: "Hints on Blistering," "Two Ways of Dressing Blisters," "Cautions About Blistering," "Strangury," "Flying Blisters." A copy will be sent free upon request.

—Write for Physicians' Catalog.

## A Practical Dressing

(By D. Webster Evans, M.D., Scranton, Pa.)

It has been my practice for several years, in dressing Laparotomies or Celiotomies, to place two-inch adhesive strips in three sections. The upper one is placed one inch below the ensiform process across the abdomen; the second across the umbilicus, and the third strip one inch above the shaved pubes.

The Evans Sealer for holding dressing in place.

I now cut two strips, two inches wide and ten inches long. I place the upper one, lapping the edge of the dressing one inch and the abdomen one inch. This secures the upper edge of the dressing firmly. I likewise attach a strip to the lower edge of the dressing and on the pubes one inch. This also secures this portion of the dressing and they both prevent the hand-borne infection, with which we are all so familiar.

The curious, investigating, time-killing patient's hands cannot find access to his wound, and thereby contaminate and infect himself. The bellows action upon respiration is prevented; in so doing air and cuticle, etc., cannot reach the wound.

My friends are wont to call this the "Evans Sealer." I never had the pleasure of seeing any one else use them and so I gladly do what I can to contribute my mite to the cause of humanity and better surgery, and especially to lighten the burden of the surgeon, as well as to save his patient from skin and occasionally deeper infection. I strongly advocate its adoption and use by all who use occlusive abdominal dressings.

The cut from photograph will give the reader the idea, even without reading the description.

---

## Hygiene in Maternity

"Hygiene in Maternity" is a forty-eight page book which many physicians and nurses like to place in the hands of expectant mothers.

" 'Hygiene in Maternity' is just like all of your books and preparations, simply the best on the market, and I make no hesitation in saying so to my patients," writes L. Dean, of 175 New York Avenue, Brooklyn, N. Y.

"This book gives expectant mothers cheer and encouragement, especially first baby cases," writes C. C. Meacham, M.D., of Bernalillo, N. M.

Johnson & Johnson will send a copy to any physician or nurse requesting it, and, if desired, will supply a quantity for distribution among obstetric patients. There is no charge for this service.

---

## You Need This Catalog

The Physicians' Descriptive Catalog is a 125-page book containing terse descriptions and accurate illustrations of the principal Johnson & Johnson products. Every physician should have a copy handy. Sent free on request.

# Redintol Results Surprise Surgeons

## Treated with this New Burn Dressing, Mild Burns Are Healed with Singular Rapidity and Severe Cases Recover—It Is One of the Good Things that Have Come Out of the War

Gradually we are coming to know that certain good things are coming out of the great war. Among these good things is probably the most successful treatment of burns that has ever been found. Those who have had experience with the treatment of burns will find it hard to credit the statement that with this new form of burn dressing we are able to keep large burned surfaces clean during the process of healing, and to dress the burn with almost no pain to the patient. It seems magical to see an extensive and deep burn healed without any contraction of tissue, and almost without any scarring.

Yet these things are true of cases treated with Redintol, the new burn dressing.

Redintol is a product of Johnson & Johnson, and consists of a mixture of paraffine and resins having dissimilar melting points. It is supplied in a solid brown wax-like cake, and in appearance looks like a cake of maple sugar.

Redintol has been used in hospitals and private practice for a considerable length of time. Surgeons have been surprised at the results. They have found that the dressing is easy to apply, that pain is eased almost immediately, that the dressing can be used without disturbing the wound, and that the healing is rapid.

### How to Apply Redintol

Redintol is applied to the tissues at a temperature of about 140 to 150 degrees F. In other words, when melted until it flows it is ready to apply. It is applied to the burned surface, being spread over the surface gently by means of a camel's hair brush. Over the wax glaze, while still warm, a thin layer of absorbent cotton is applied. This layer of cotton is made by splitting a sheet and cutting into convenient size pieces. The layers of cotton are gently forced into the glaze, and over the layers of absorbent cotton another coating of melted Redintol is spread.

(Ordinary absorbent cotton may be used, but Johnson & Johnson prepare a special form of sheet cotton for use with Redintol.)

When the coating is complete it may be covered with the usual gauze, cotton, or lint dressing, held in place with a bandage or adhesive plaster.

In extensive burns for the first few days the shell is to be removed once in twenty-four hours. After a few days a dressing can be left in place for a longer period.

Before applying the Redintol, the surface of the wound is to be made dry. This can be done by the use of absorbent cotton, gauze, blotting or filter paper, or a fan. There are, however, in the market electrical driers, such as the apparatus used for drying the hair.

There has also been devised a special apparatus for the application of Redintol, in the form of an atomizer, so made as to blow a fine spray of the melted Redintol upon the burned surface. But while these forms of apparatus are useful, especially where there are frequent cases to be dressed, they are not essential.

After a few days' treatment, upon removal of the dressing, a definite border of rapidly proliferating tissue will be found, and if there are any undestroyed cells, islands of new skin will appear as

# Redintol Burn Dressings

Photographs taken from actual cases in one of the large metropolitan hospitals

Extensive burned area undergoing treatment with Redintol. Proliferating tissue is shown around the border.

Melted Redintol is conveniently applied to the injured surface with a camel's hair brush, gently dabbing without pressing or brushing.

Several forms of atomizers and apparatus have been devised for the application of Redintol. With this apparatus a fine spray of melted Redintol is applied to the burned surface.

Surface to which Redintol is to be applied is to be made dry. This can be accomplished by fanning by hand, or by the use of heat, or an electric drier.

After the first coat of Redintol is supplied, sheet cotton is placed at once over the wax cast and a second coating of melted Redintol is applied. The whole is then covered with the usual bandage dressing.

Redintol promotes healing of the tissues without the usual scarring, and with lessened contraction of the skin or tendons.

grayish-white spots dotting the surface. If the burn has left portions of epidermal tissue, the Redintol method of treatment will save it and favor its rapid repair. Under the dressing new skin begins to form immediately, and in an exceedingly short space of time the entire surface begins to be covered.

Redintol has also been found useful in granulating wounds, in the treatment of chilblains, frostbites, bruises, excoriations, and in other conditions of raw, denuded and inflamed areas.

NOTHING GAINED BY GRAFTING

The following is an extract from the report of one of the users of Redintol:

"Burns healed with rapidity; constitutional symptoms rapidly abated; pain was reduced to a minimum; scarring seemed to be obviated, or at any rate was not apparent; the burns healed so rapidly, with healthy granulations, that there appeared to be nothing gained by grafting; patients were singularly free from sepsis."

The conclusion arrived at was that under the treatment mild burns healed with singular rapidity, and severe cases, that would have been unlikely to recover by the ordinary methods of treatment, recovered.

HOW REDINTOL IS SUPPLIED

Redintol is supplied in one-pound cakes, this being the most convenient form for hospital and general use. It is also supplied in what is known as Individual Redintol Burn Dressing for use in first aid work, in the home, factory or shop, for immediate application.

The Individual Redintol Burn Dressing consists of a small cake of the dressing, with a cotton applicator for spreading it over the surface of the burn. Accompanying this is some sheet cotton to apply over the first glaze.

Redintol in its various forms may be procured from the drug trade and from dealers in surgical supplies.

## BABY'S FIRST DRESSING

**Johnson & Johnson Offer a Complete Outfit, Recommended by the National Committee for the Prevention of Blindness, and Fulfilling the Requirements of State Laws**

Johnson's First Dressing for Infants is a much-needed article. It is a complete outfit containing material for cleansing, tying and dressing the umbilical cord and also material for cleansing the mouth, nose and eyes, including an ampoule of nitrate of silver solution for instillation into the infant's eyes when necessary.

The need of such an outfit requires no argument. In the best of families material for these purposes is seldom at hand when wanted. In ordinary families and in cases where the birth is in charge of a nurse or midwife no material of this kind is provided.

For the lack of proper material at the time of birth tetanus and other infections follow, but of still greater moment is the appalling danger of blindness from ophthalmia neonatorum. The statement is made that "from one-quarter to one-third of the pupils admitted to the schools for the blind have lost their sight from infection acquired at birth or during the first ten days of life, and there are innumerable other cases of those who are partially blind from the same cause.

"The responsibility for this appalling condition rests with the nurse, midwife or physician who had charge of the confinement."—F. Park Lewis, M.D.

This outfit meets all these needs. It also fulfills the requirements of the growing number of States which require the use of prophylactic measures in cases of babies' sore eyes at the time of birth. Nearly thirty States require cases of babies' sore eyes to be reported to the Board of Health; eighteen require or recommend prophylactic measures.

This outfit also meets the recommendation of the National Committee for the Prevention of Blindness. Many medical organizations have recommended the use of such an outfit.

The Johnson's First Dressing Packet contains the following items:

One envelope containing two sterilized tapes for tying the umbilical cord.
Two gauze pads (one with perforations) for dressing the umbilical cord.
One package boracic acid for cleansing and disinfecting the umbilical cord and eyes.
Two small gauze pads for cleansing the eyes, mouth, etc.
Three pieces of sterilized absorbent cotton for cleansing the eyes and dressing the cord, etc.
One ampoule of nitrate of silver solution (one per cent.) for instillation into the infant's eyes when necessary.
One flannel binder for holding the umbilical cord in place.
Three safety pins.
One miniature package of Johnson's Toilet and Baby Powder for use after the infant's first bath.
One miniature bottle of Synol Soap for cleansing the hands, bath, etc.
One chart for making the birth record

Full directions accompany each item and a circular in each packet gives instructions to the nurse or midwife.

## Dressings Used in the Great War

These illustrations show some of the types of dressings prepared for the use of the Army and Navy Expeditionary Forces. A feature of the present-day Army Dressings consists of the fact that they are compressed in small packages for convenient transportation. As, for example, the upper left package is one ounce of absorbent cotton; the middle package left consists of gauze sponges slightly compressed and packed in a carton; lower package left, Zonas Gauze Bandage, compressed; center, first aid instruction packet used in giving instructions to recruits on the use of the regulation army first aid packet, two sets of first aid dressings are enclosed in the carton with directions for handling. They are frequently used several times for practice purposes. Center lower, Regulation United States Army Packet, compressed, enclosed in metal container sealed by soldering. Attached to the container is a ring to hang the packet upon the belt; by the use of the ring the solder is pulled off. The packet contains the regulation triangular bandage, gauze compress and safety pins. Upper right hand, First Aid Packet for Shell Wounds. This packet contains one large gauze compress, with four-tailed bandage, one gauze bandage with safety pins. This is intended for large wounds and is to be applied at once to the surface of the wound. These are the leading types of bandages which are being supplied to the United States Army and Navy in large quantities.

## From the Mail Bag

The following are extracts from letters received by the Editor:

Dr. Edward Preble, 519 West 143d Street, New York City—A prominent surgeon told me the other day that your delineations of the Carrel-Dakin method of wound sterilization as shown in Red Cross Notes, Special War Issue, are the best and practically the only ones he has seen of the operation of the Carrel-Dakin methods.

---

Dr. G. I. Hogue, Major, Medical Corps, Wisconsin National Guard, Milwaukee, Wis.—Please send me thirty-five copies of Special War Issue of Red Cross Notes, as I wish to distribute them to the members of the Hospital Corps, Wisconsin National Guard. I wish to congratulate you on this splendid edition.

---

William H. Price, M.D., 801 Prospect Place, Brooklyn, N. Y.—Would it be possible for you to let me have sixty copies of the Special War Issue of the Red Cross Notes to place one in the hands of cach of my Sanitary Red Cross Detachment. These men are preparing for medical service in our army and navy and I feel they will profit by a close study of this issue.

---

Dr. Lillian Shields, Union Savings Bank Building, San Francisco, Cal.—Have just finished reading the Special War Edition of Red Cross Notes. It is fine. I have always used your goods as far as possible. I am glad you are going to supply the government, for that means they will get the best of everything.

---

Dr. J. Ernest Dowdy, Winston-Salem, N. C.—Your Special War Issue of Red Cross Notes is the best yet and you are to be congratulated on giving these concrete facts to the medical profession. Believe me to be a regular user of your products.

---

Dr. Frank B. Keleher, 115 Sixth Avenue, Brooklyn, N. Y.—Interesting facts in condensed form as shown in the War Issue of the Red Cross Notes are very valuable to a teacher.

---

Dr. A. H. De Lano, Lone Tree, Iowa—Your Special War Issue of Red Cross Notes seems to be full of diamonds.

---

Dr. E. M. McKee, Lexington, Ky.—I thank you for the Red Cross Notes. They are of value to all.

---

Dr. C. L. LeMar, Osceola, Neb.—The Special War Issue of the Red Cross Notes is fine.

---

Dr. M. E. Eastman, Weaverville, Cal.—I have perused the pages of the Special War Issue of the Red Cross Notes with great interest and much benefit.

---

Dr. J. H. Temple, Seminary, Miss.—Your Special War Issue is extra fine.

---

## First Aid

"The package of First Aid Handbooks has been received and the commanding officer of this camp, Lieutenant Sloan, and the men of the camp join me in thanking you for the same," writes Harry F. McGuire, Medical Corps, First Pennsylvania Infantry, U. S. A., Detachment Medical Headquarters, Camp Sloan, Pequea, Pa. "I wish to state that the books have helped the men wonderfully in mastering the complex work of first aid which I am trying to teach them."

---

"I consider your First Aid Handbook

a valuable little pamphlet which could be used to advantage in training enlisted personnel for the Medical Department of the U. S. Army," writes the Surgeon Major in charge of a Reserve Officers' Training Camp.

"Your First Aid Chart is not only one of the best I have seen, but is a real work of art," writes J. W. O'Connor, M.D., Chief Surgeon of the Denver & Rio Grande Railroad Co.

## Synol Soap in England

Some time ago the Kingdom of Great Britain established an embargo against the importation of all soaps. Unfortunately, this included Synol Soap, which has become firmly established in the medical and surgical practice. This action caused a large number of letters to be written to the authorities asking that the embargo be raised. The following is an extract from a letter of an eminent specialist connected with several of the hospitals in London:

"I understand that Synol Soap can no longer be imported from America to this country.

"I desire as a professional man and a large personal user of Synol Soap to express to you my sense of extreme regret at this decision. Synol Soap must be considered from the medical point of view an absolute necessity, and for these reasons: (A) It is a valuable antiseptic agent for dressing wounds. (B) It is a cleanser of the first order, i. e., it can be used in the operating theatre prior to operations, either for preparing the surgeon's hands or the proposed patient's skin. (C) It is a powerful deodorant when used for general ablution, and, finally, either alone or miscible with water, produces a non-irritating and abundant lather which serves to cleanse and purify any article, flannel, linen or cotton fabric, etc., submitted to its action.

"After very extensive trial I have been unable to discover any substitute for Synol Soap which can be relied upon to the same extent.

"The surgeon or obstetrician with this preparation handy, can in an emergency, fall back upon an antiseptic agent of fixed value—a factor, I may add, of priceless import in certain contingencies."

## A Head Bandage

Dr. Thomas E. Shea, of Twenty-third and Parrish streets, Philadelphia, Pa., has suggested the head bandage here illustrated.

The base bandage passes around the circumference of the head, either shaved or covered with hair. When placed over hair it may be removed by soaking with coal oil or some solvent of plaster coating.

Note the anchors to which is fastened the tape which passes over the dome of the head and holds the dressing in place. Any convenient number of anchors may be used.

## A Redintol Circular

A four-page circular describing the technique of using Redintol, the burn dressing, will be sent to any physician, on application to Johnson & Johnson, New Brunswick, N. J.

# Ideal Surgical Catgut

**The ideal catgut ligature, surgeons will agree, is the perfect cord, made of healthy, normal animal tissue; sterilized, aseptic and unchanged in character; absorbable without reaction or disturbance of wound-healing process.**

**Thirty years of study in the Johnson & Johnson laboratories has demonstrated that perfect surgical catgut can only be produced when the separation and manipulation of the material is carried on in its entirety with a full consideration for the use to which it is to be put.**

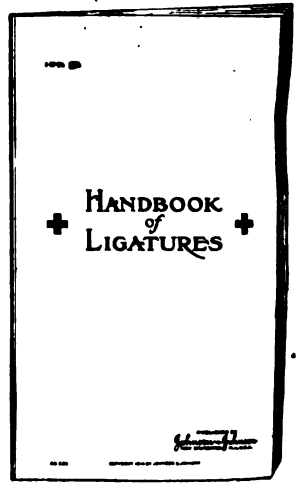
**The same methods that prevail in the preparation of tennis racquet gut and musical strings cannot produce the ideal surgical catgut.**

Chromicizing the intestinal tissue before twisting it to make a strand. This insures perfect evenness throughout.

Johnson & Johnson are the only manufacturers who control the preparation of catgut ligatures from the moment the animal tissue is removed from the lamb until the finished ligature is packed and sterilized.

Johnson & Johnson have produced ideal catgut. The surgeon can use it with complete confidence.

An excellent volume of information on the subject of Ligatures is the Handbook of Ligatures. The Johnson & Johnson Laboratories have made an extensive study of catgut, and the result of their research work is worthy the close attention of surgeons. A copy will be sent free on request.




## Johnson & Johnson

**New Brunswick, N. J., U. S. A.**

656

# PEACE ISSUE

Series VII Number Ten

# RED CROSS NOTES

PUBLISHED BY
Johnson & Johnson
NEW BRUNSWICK, N. J., U.S.A.

Copyright 1919, Johnson & Johnson

*—Copyrighted by Committee on Public Information*

## THE RECONSTRUCTION OF AMERICAN SOLDIERS

The aim of the Surgeon General is the reconstruction of American soldiers, disabled in action, "to the point of maximum functional restoration both mental and physical." Healing of an amputated and fractured member is not in itself sufficient. Usefulness must be returned to the mained part so that the loss may be to a great measure negatived. This is now known as functional restoration, and the new science, if it may be called that, is being developed more and more in Army hospitals.

# Catgut Sterility Assured

WHEN you are made responsible for the life of the patient on the operating table you are never confronted with an annoying doubt as to the sterility of the catgut you are using, if you have specified Johnson & Johnson catgut.

High Pressure Steam Sterilizer in use in Ligature Department of Johnson & Johnson
Normal working capacity, 10,000 tubes

By handling in our own laboratories every step of the process of sterilization, from the minute the intestines are removed from the sheep until the final sterilization in the sealed tubes or envelopes, and then submitting samples of each finished batch to a bacteriological check test, we are sure that we are sending out catgut that is sterile.

Thirty years of experience in preparing catgut ligatures has impressed upon us the advantage of the initial control of the strand. The sterility, the strength and the elasticity of the cord depend largely upon how it is handled from its inception.

The name of Johnson & Johnson upon a tube or envelope of catgut is a guarantee that the ligature is sterile, flexible, strong and free from reaction.

JOHNSON & JOHNSON, New Brunswick, N. J., U.S.A.

# RED CROSS NOTES

COPYRIGHT 1919 BY JOHNSON & JOHNSON

SERIES VII NEW BRUNSWICK, N. J. NUMBER TEN

Fred B. Kilmer, Editor

This publication is issued from the laboratories of the publishers with the intent to give, in brief, items of interest and reports of original research along the line of the particular branches of the art in which they labor.

Persons receiving *Red Cross Notes* will confer a favor by notifying the publishers of any inaccuracy in the address on the wrapper and of any change of their address.

## Healing the Wounds of a War-Marked World

Just as Americans threw themselves into the war with an abandon and enthusiasm that brought victory to the forces of democracy sooner than was generally thought possible, they are now ready, at any cost of personal sacrifice, to serve humanity and posterity in these days of reconstruction.

The poisonous wounds of war are being flooded with that powerful antiseptic, peace; the war-marked world is showing remarkable vitality, and the peace doctors hope to carry it through the crisis and restore it to its usual activities within a short time, and without the usual scarring.

This splendid spirit of Americanism has been exemplified by no class better than by the American doctors and nurses. Their part in the war furnishes a brilliant chapter in the conflict's history. Forgetting all personal interests, they responded to the call of humanity. Some of them made the supreme sacrifice.

Nor was all the service performed upon the battlefield. The doctors and nurses who remained at home to assume the larger responsibilities created by their lessened ranks did much to sustain the nation. Their wonderful work during the influenza epidemic will stand as one of the heroic deeds of the war period.

It was the great privilege of Johnson & Johnson to stand shoulder to shoulder with the profession on the firing line and at home. We gave of our staff three killed, some wounded and several missing in action. We met the needs of the Army, Navy, Red Cross and Allied forces with hundreds of millions of bandages and thousands of miles of gauze and adhesive plaster.

It required day, night and Sunday work to perform the task, but our army of loyal workers, equal to the occasion, kept our enormous laboratories throbbing at high speed. It may be truly stated, and in

no boastful spirit, that without the facilities of Johnson & Johnson the United States and Allied forces would have been unable to obtain surgical dressings in sufficient amount to meet their requirements.

The war activities also greatly increased the demands on the civil hospitals, and their calls for supplies were met. To do it we had to abandon certain goods entirely and to make all our business subservient to the needs of the Government and the hospitals.

Freight, express and postal embargoes; raw material, coal and labor shortage, and advancing costs helped to complicate the situation, and dealers were not able to keep their stocks complete. But with the signing of the armistice things began to move differently and it will not be long before normal conditions will prevail and the stocks of dealers will be replenished.

We want to express our thanks for the loyal co-operation we have received from the medical profession and the hospitals of the land during these dark days of the war. We rejoice with them that America is a greater nation because of the war and that the arts of medicine and surgery have been strengthened by the experience of war, and we know that they will appreciate the knowledge that war has greatly increased our facilities for taking care of their needs in the future

---

## The Van Horn and Sawtell Department

Johnson & Johnson have taken over the well-known firm of Van Horn and Sawtell, of New York, and have made it the Van Horn and Sawtell Department of Johnson & Johnson. This consolidation means the continuation of a policy of progress, a gratifying increase of laboratory facilities and the addition of Mr. E. T. Sawtell and Mr. Alfred Van Horn to the personnel of the Johnson & Johnson organization.

The union of two such American firms—each proud of its reputation and the part it has played in promoting the quality and reliability of sterilized surgical dressings—will mean a great deal to thoughtful medical men, who realize the extent to which the successful practice of medicine and surgery depends today on the co-operation and good faith of the well-equipped manufacturer of medical and surgical supplies.

The specialties of Van Horn and Sawtell will continue to be supplied and marketed in the same form, character and quality that the users of these various products have come to expect and appreciate. This applies not only to their sutures and ligatures, but also to their favorably known specialties, which are:

K-Y Lubricating Jelly.—A remarkably useful and cleanly surgical lubricant and emollient; non-greasy, water-soluble, non-irritating and non-corrosive.

K-Y Analgesic.—A safe and effective local anodyne, non-greasy and water-soluble. Used with success whenever an efficient local pain-reliever is indicated in headache, neuralgia, inflamed joints, lumbago, sciatica and similar ills.

Interol.—An exceedingly pure and high-grade mineral oil adapted for use whenever a reliable intestinal lubricant is necessary or desirable.

# The Paraffin-Film Treatment of Burns

## The New Method of Dressing Burns and Granulations Is Being Used with Most Satisfactory Results in Hospitals and Private Practice— Promotes Healing Without Scarring

When the medical profession was first informed, through articles in the lay press, of the wax or paraffin-film treatment of burns being used in the French war hospitals, it viewed the statements of remarkable results with just skepticism. Knowledge of the treatment was largely a matter of hearsay and conversational reports of a few men who had seen it used.

Today this feeling has changed. The medical journals have printed many reports of surgeons who have used the wax treatment of burns with success.

### Converted from Skepticism

Dr. Edward Hammond Risley, of Boston, in a paper on "The Modern Treatment of Burns," read before the Section of Surgery of the Massachusetts Medical Society, sums up his experience with the paraffin-film treatment, in the Massachusetts General Hospital, in these words:

"From my rather limited experience with paraffin preparations I can say that I have been converted from skepticism to a rather firm belief that this method of treating burns (especially those of limited area) is a decided advance over other methods formerly employed.

"Points in its favor are: It is not a painful dressing; it is easy of application and removal; it does not favor in-

Gas burn, second and third degree. Photograph taken on fifth day. Cured in 33 days. No cicatrices.

Gas burn, second and third degree. Photograph taken on fifth day. Discharged from hospital on twenty-first day. Cured in 31 days.

*Photographs used in this article by courtesy of Dr. William O'Neill Sherman.*

Several second degree burns, face and hands with slight third degree gas burns. Completely healed in 35 days. Note absence of cicatrices.

fection; it produces more rapid healing; it leaves a smooth, soft, pliable scar.

"From the point of view of comfort of the patient alone it is a decided advance over any other form of dressing."

### A Distinct Advance in Surgery

Dr. Elwood B. Haworth, of Pittsburgh, surgeon of the Western Pennsylvania Hospital, writing in Surgery, Gynecology and Obstetrics, reports his experience in part as follows:

"The treatment of burns and granulating wound surfaces with paraffin preparations has proved to be a distinct advance in surgery and any surgeon who has employed this method of treatment cannot but realize that the results obtained are much superior to those obtained by any other procedure.

"Wounds cicatrize in one-third to one-half the time. The scar tissue is less dense and more flexible and skin grafting is comparatively not often required. Should skin grafting be thought advisable it will be found that, under the paraffin-film application, these grafts will develop much more rapidly than by any other known method.

"The action of the paraffin-film application upon granulations is largely mechanical. On cooling, the film contracts and exerts a suction action, thus inducing an active hyperaemia. By keeping the wound airtight, and by acting as a splint or scaffolding to the granulations, it promotes active proliferation of the newly formed tissue cells."

### The Patient Is Free from Pain

During the past seven years at the Carnegie Steel Company, Pittsburgh, Dr. William O'Neill Sherman, the chief surgeon, and his assistants have treated 31,448 first and second degree burns and 4,683 third degree burns. They have thoroughly and scientifically tried every known method.

When reports came from France early in the war of the remarkable success of

Very extensive second degree burns of both hands, July 6, from liquid fire. Burns completely healed. No contractions; perfect function restored, August 20.

the paraffin-wax method of treatment of burns, Dr. Sherman went to France to investigate, not without misgivings and doubts. He has given a report of his investigation in Surgery, Gynecology and Obstetrics, from which the following is extracted:

"To seal up an infected wound was thought to be contrary to all sound surgical principles. Notwithstanding this, the patients were being dressed without pain; they were recovering two or three times more rapidly than under former methods and free from cicatricial contraction with a minimum of scar tissue. It must not be assumed that all third and fourth degree burns heal without any scar tissue formation. There is some scar tissue, but it is infinitely less than with any other method and does not have the tendency to contract, so that the frightful disfigurements and loss of function are practically eliminated.

"After the first 24 hours the patient is free from pain in the vast majority of cases. This one factor alone justifies its use. The objection to the method as used at Issy was the great amount of time consumed in doing the dressings. By improving the technique, this objection has been overcome. Upon the writer's return from Europe in November, 1916, immediate efforts were made to improve the technique; at the present time, even the largest burns can be dressed in five to eight minutes without much discomfort or annoyance to the patient. We have treated more than three thousand cases to date and find this method superior to all others.

"It is now in use in every one of our emergency hospitals as a standard treatment. The men have learned, from the experience of their fellow workmen, the superiority of the paraffin method and ask for it. It is useless to compare this method with other methods because of its undoubted superiority. It is an ideal treatment for burns."

### Redintol Is a Paraffin-Film Dressing

To meet the demand of surgeons for this method of burn dressing, Johnson & Johnson have marketed Redintol. This preparation is now well established and most satisfactory and enthusiastic reports have been recorded as to its use in hospital and private practice.

Redintol, after being melted, is usually applied to the injured surface with a camel's hair brush. Over the glaze formed by the compound a thin layer of absorbent cotton is placed, and a second layer of cotton is pressed into the warm Redintol dressing, and a second coating of the melted Redintol is brushed on. The completed dressing may be held in place by adhesive plaster or bandage.

Annular burn, third degree, involving 95 per cent. circumference of thigh, exposing popliteal vessels. Photograph taken seven months after patient was burned. A number of different treatments were used with failure. No repair in seven months. During this time the patient suffered excruciating pain at dressings. Note extensive contractions. White areas seen on external surface of thigh are light shadows.

Patient treated with paraffin wax; 4 small grafts, tenotomy of hamstrings with complete healing of burns and excellent functional result. Dressings were painless from beginning of wax treatment.

Johnson & Johnson prepare a special form of sheet cotton, known as Redintol Cotton, for use with Redintol burn dressing. Redintol Cotton is in thin sheets, 9 by 12 inches, and can be cut or torn into the size desired to cover the parts. It is supplied 100 sheets in a box.

Ordinary absorbent cotton may be used with Redintol, but Redintol Cotton is much more convenient.

The great and peculiar difference between the Redintol and other forms of treatment for burns is that with the Redintol treatment all disturbance of the newly formed cells is avoided.

### Many Uses for Redintol

Redintol has also been found useful in the treatment of chilblains, frost bites, bruises, excoriations and in conditions of raw, denuded or inflamed areas. A recent reporter suggests its use as a dressing for inflamed areas in erysipelas. It is believed that many other uses will be developed.

Redintol is supplied in one-pound cakes, for hospital and general use, and also in a form known as Individual Redintol Burn Dressing, for use in first aid work. The Individual Dressing consists of a cake of Redintol sufficient for at least one dressing for any ordinary burn, four pieces of Redintol Cotton and an applicator for applying Redintol.

Redintol preparations may be obtained through the drug trade or physicians' supply houses.

## Cicatrization of Burns Under Film Dressings

A recent report by Fremiet and Pfuhl upon the cicatrization of burns under film dressings (such as Redintol) furnishes some noteworthy observations. From a clinical point of view, they report, the pain, even in large burns, diminishes, the slough disappears and the wound assumes a reddish hue, beginning to granulate normally. As granulation proceeds, the entire raw surface of the wound is becoming covered by a puriform exudate, essentially made up of leucocytes (polynuclear neutrophiles) and a serous fluid; it is impregnated invariably—and the authors insist upon this point—with a large number of living bacterial elements, in spite of the presence of an active phagocytosis. These bacteria consist of faculative anaerobes such as staphylococci and streptococci, bacillus pyocyanicus and some atmospheric microbes.

From the histological point of view, cicatrization occurs by a rather rapid formation of a loose, structureless mesenchymatous layer, in which vascular formation is very active; the principal elements in this mesenchyma, most generally oedematous, are fixed connective tissue cells, of which a large number show mitotic division and motile cells, specially polynuclear leucocytes, which are in constant motion; the granulating surface is thus covered by a false membrane, formed by a large number of leucocytes, enclosed in a net of coagulated albuminoid substances; the membrane seems to be one of temporary protection and disappears in proportion as epidermization advances.

Epidermization proceeds in the well-known classical way and may be very active.

From a bacteriological viewpoint, no microbe could be discovered in the newly formed tissue, underneath the superficial false membrane. Whenever an accidental infection underneath this false membrane did occur, the granulating tissue concerned underwent necrosis and a secondary sphacelus was formed.

The authors, basing themselves on their observations, believe themselves entitled to conclude that the infection of the wounds which they have studied remains strictly superficial, and this they attribute to the action of the leucocytes that continually traverse the granulating tissue and to the barrier represented by the false membranous covering. The newly formed tissues, then, under a paraffin dressing, develop aseptically by the simple function of the normal defenses at the disposal of the organism and without the aid of the intervention of any antiseptic substance.

---

### Redintol for Erysipelas

(By J. E. Walker, M.D., Huntsville, Ala.)

I have treated two cases of erysipelas with very great success with Redintol. Erysipelas, or the erysipelas germ, being an open-air germ, dies if the air can be taken away from him, and the Redintol does this and is a simple and cheap dressing.

I only made two applications and the erysipelas was under absolute control. I applied just as directed for a burn. The first dressing I let stay forty-eight hours and the second twenty-four hours, but it would have worked all O. K. to have let the first dressing stay the whole time.

---

### Success with Wax Dressing

Dr. J. H. Branth, of New York City, reports that for some time he has used a mixture of waxes for sealing wounds. He uses a preparation of this character on nearly all sutures, leaving the lowest base for drainage. A preparation of this kind acts as a splint for immobilization. He uses a gauze pad to absorb the exudate. The wax peels off after healing is completed. Re-dressing is, of course, necessary where exudate is collected.

# Out of the War Has Come Chloramine-T Gauze

## It Will Be Found Convenient for the Application of Chloramine-T, One of the Antiseptics Which Has Proven of Service in the Treatment of Wounds of Recent Origin

The European War has brought considerable advancement in the knowledge of antiseptics as well as a change in the method of employment. This advancement and these changes have been of great value in civil and industrial practice.

Among the antiseptics which have proven of service are various compounds of chlorin. Chloramine-T is a shortened name for the antiseptic, the chemical name of which is sodium toluene-sulphon-chloramide. It is a crystalline chemical compound containing about 12 per cent. of chlorin.

"In equi-molecular solution the germicidal activity is about four times that of sodium hypochlorite; its germicidal power is said to be fifty times greater than carbolic acid, and is rapidly exerted. In some respects it closely resembles the hypochlorites, although it is decidedly less irritating than the latter."

According to Dakin, chloramine-T is decidedly non-irritating but it is not suitable for internal administration.

Chloramine-T Gauze is gauze impregnated with 5 per cent. of chloramine-T, and it is believed it will be found convenient for the application of this highly antiseptic substance.

### Prevents Progress of Infection

The writings of Dakin, Dunham, and others who have given attention to the use of the chloramines, indicate that this gauze has found its greatest value in application to wounds of recent origin in which the chief object is to prevent the progress of infection. It is found to be particularly adapted to use in industrial accidents or as a first aid application, especially to wounds which are believed to be infected.

Certain writers have suggested the use of chloramine-T in the form of gauze as an application to burns, especially if the burn is badly infected. It has also been suggested as an application to skin ulcers and in the treatment of such forms of skin disease as eczema, acne, etc.

### The Report of a Surgeon

The following has been received from a surgeon who has used Chloramine-T Gauze:

"I have used the Chloramine-T Gauze in the case of a large carbuncle of the neck, non-diabetic, which I packed daily.

"There was another large boil on his head which was treated with tincture of iodine. The same cleansing for each.

"The one treated with Chloramine-T was cleaner, with quicker healing processes, while it was many times the size of the other. It was much cleaner than the one treated with the tincture of iodine.

"No bacterial count was made."

The gauze is preferably applied dry. If desired, however, it may be moistened after application; in moistening boiled water should be used.

No other antiseptic should be applied in conjunction with Chloramine-T Gauze, and by all means it should not be moistened with alcohol, hydrogen peroxide or glycerin.

Chloramine-T Gauze is a product of the Johnson & Johnson research laboratory. It can be obtained through the drug trade. Johnson & Johnson will, upon request, send samples of this gauze.

*Copyrighted by Committee on Public Information.*

A French bomb-proof hospital, many feet underground, near the fighting line.

## Extension of Medical Education After the War

A well-known professor in one of our medical colleges recently stated that immediately after the close of the war he proposed to put together what might be termed a medical and surgical unit, patterned after the units which have been sent to France by the American medical profession.

The idea is to collect a corps of teachers, nurses, and the necessary paraphernalia to demonstrate American methods, especially American teaching methods, in medicine and in surgery. Of course it would not be thought necessary to have the upwards of one hundred people which now constitute a so-called unit, but simply to have a sufficient number in the party to carry out the scheme. He would gather representative instruments and apparatus, charts, photographs, etc., to show the advantages of American teaching institutions. His intention would be to visit the principal points of South America, and possibly some portions of the countries which have been at war.

Several advantages might accrue from such a mission. American physicians and surgeons would learn the methods of the countries visited, and the exchange of ideas would be profitable. He is particularly interested in those countries which have heretofore sent their students to Germany, and believes that with the present advancement in American colleges and medical institutions, foreign students would do well to visit the United States.

Another hope is that such a demonstration would be of advantage in the circulation of American medical literature. Heretofore, in South American and other countries, practitioners have looked either to Germany or to France for their literature. It is undoubtedly true that medical literature in the English language is becoming abundant and meritorious. The English language is now universal in commerce. Foreign-speaking practitioners of medicine usually have a knowledge of English, or are willing to take pains to acquire it.

# Ligatures and Sutures

## PAPER I

*(Contribution from the Scientific Department of Johnson & Johnson)*

A widely expressed desire for a broader knowledge of these important subjects has suggested the preparation of a series of notes in the form of papers, of which this is the first, upon the nature and properties of the various materials used for ligating and suturing in operative surgery. These notes have been compiled, and are presented, with a particular view to the needs of students, nurses and others more or less intimately associated with the handling and use of these essential materials.

### A Few Definitions

The terms "ligatures" and "sutures" are sometimes erroneously regarded as synonymous. The difference between the two should be understood.

Ligature, when used as a noun, means the thread or cord with which an artery or vein is tied to prevent or arrest hemorrhage. It is also applied to a cord, thread or wire used to remove tumors, etc. When used as a verb, it means to tie.

The ligation or tying of arteries has been practiced from very ancient times. While the ligature has been mentioned by many ancient surgeons before and after that noble old Roman, Celsus, it remained for Paré, the equally renowned French surgeon, to adopt it as a revolutionary method, and, consequently, he may reasonably be looked upon as the "Father of the Ligature."

Suture, when used as a verb, means to stitch or to sew. In surgery, and defined literally, it means the stitching together of the edges or lips of a wound to effect union. Suture material is used in sewing together tissues, blood vessels, nerves, bones, etc., until normal union is performed by Nature.

### Absorbable Sutures

Sutures are divided into two general classes—the "absorbable" and the "non-absorbable."

Absorbable sutures (or ligatures) are those which, during the healing process of wounds, are absorbed by the tissues in which they are embedded. Those most commonly used are catgut and kangaroo tendon. Other materials have been suggested, such as the tendons of the ox, deer, reindeer, rat, muskrat, the nor-whale, heron, crane and other animals and birds. With, however, the exception of the well-known catgut and the kangaroo tendon, the materials named have not been generally adopted, principally for the reasons that they are irregular in size and difficult to procure.

Animal tendons consist of layers of longitudinal fibres, which are split to form a suture of suitable size. This splitting is a difficult process, performed by skilled operatives specially trained for the work. Animal tendons are readily absorbed. Those of the kangaroo are the best-known among materials of this character, and are formed by Nature into sizes suitable for the purposes for which they are used.

Catgut is a ribbon-like material which can be twisted into a cord, presenting at once the most acceptable type of absorbable suture.

### Non-Absorbable Sutures

Catgut, by being chromicized or tanned, can be made to resist absorption for varying periods of time, but it is finally absorbed.

There are, however suture materials in very general use which are practically non-absorbable and, as such, remain in the tissues for an indefinite length of time. Examples of such substances are silk, silkworm-gut, linen, horsehair and the various metallic wires, such as silver, copper, aluminum, bronze, etc. It may be noted that, in the course of time (sometimes years), some of these so-called "non-absorbable" sutures disintegrate and disappear; but they are not absorbed during the process of wound-healing.

### Silk Sutures

The silk fibre consists of a continuous thread spun by that species of caterpillar known as the silkworm. The so-called Mulberry silkworm, cultivated in many countries, produces the bulk of the trade silk of the market.

The eggs from which the silkworm is produced are laid by a scale-winged insect of the genus Bonebyx. The growth and development of the worm is very rapid. When the worm reaches maturity it exudes a viscuous fluid that forms, on contact with air, a continuous thread, and with this it forms its cocoon. After finishing the winding of its cocoon, the enclosed silkworm passes into a chrysalis, or pupa. From this condition it eventually emerges as a butterfly. In the production of silk for commercial purposes, the development of the pupa is arrested at a certain stage by subjection to heat, which kills it.

The silk fibre is obtained by unreeling the cocoon, and this process produces what is known as raw silk. The short tangled fibres from the exterior of the cocoon are the source of floss silk, from which spun silk is made.

Before being manufactured into textiles, the raw silk thread is subjected to several processes, which give the fabrics into which it is subsequently woven their soft texture and glossy appearance.

The chemical constituents of silk consist of the following substances: Sericin fibroin, resins, fats and mineral matter. Fibroin, which constitutes the major portion of the fibre, is a proteid, analogous to that contained in wool. Sericin is an altered form of fibroin, the so-called silk glue which forms the outer coating of the fibre.

Silk is notable for its tensile strength, which is stated to be equal to that of an iron wire of equivalent diameter. It is very elastic. Boiled-off silk, and silk weighted with fillers, etc., to lend it luster, are impaired in the sterilization process as to both strength and elasticity.

Silk will withstand a temperature of 110° C. (230° F.) without decomposition. Silk is dissolved by strong hot alkalies, and by concentrated sulphuric and hydrochloric acids. Silk readily absorbs coloring matter, dyes, etc. Under the microscope, true silk is a structureless thread, the so-called "wild" silks being made up of bundles of delicate fibrille. The threads, as spun by the silkworm, are twisted and braided together to form what are known technically as "twisted silk" and "braided silk" respectively. Raw silk is cream or orange color. As found in the market, however, it is white, due to scouring and bleaching.

Many surgeons prefer silk sutures that have been dyed black, this color being more readily perceptible in the wound cavity or tissues. Silk of this type is known as "iron dyed."

### Sizes of Silk Ligatures

In the early days of the Listerian system, silk sutures were confused with the sizes of violin strings and catgut, supposedly conforming to the wire-gauge system. In the course of time a market standard was adopted, in which there are some twenty or more sizes with con-

secutive numbers. The standard is based upon the yardage per ounce. The following table shows the approximate yardage per ounce of the twenty sizes:

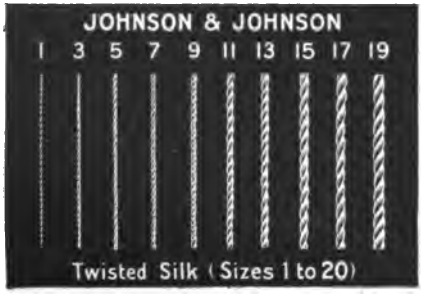
| Surgeon's White Twisted Silk | | | |
|---|---|---|---|
| No. | Yds. to Oz. | No. | Yds. to Oz. |
| 1 | 2265 | 11 | 299 |
| 2 | 1865 | 12 | 232 |
| 3 | 1532 | 13 | 170 |
| 4 | 1198 | 14 | 136 |
| 5 | 932 | 15 | 115 |
| 6 | 765 | 16 | 95 |
| 7 | 565 | 17 | 80 |
| 8 | 465 | 18 | 65 |
| 9 | 444 | 19 | 50 |
| 10 | 365 | 20 | 40 |

| Surgeon's White Braided Silk | | | |
|---|---|---|---|
| No. | Yds. to Oz. | No. | Yds. to Oz. |
| 1 | 670 | 11 | 90 |
| 2 | 414 | 12 | 80 |
| 3 | 356 | 13 | 63 |
| 4 | 320 | 14 | 50 |
| 5 | 223 | 15 | 45 |
| 6 | 177 | 16 | 41 |
| 7 | 170 | 17 | 36 |
| 8 | 148 | 18 | 31 |
| 9 | 120 | 19 | 28 |
| 10 | 103 | 20 | 24 |

The so-called "iron dyed" silk is of the same sizes, but the weight of the dye gives a different ratio of yards per ounce.

Surgeons frequently use the designations "fine," "medium" and "coarse," which, respectively, would be equivalent to numbers 5, 9 and 12 in twisted silk, and 4, 7 and 10 in braided silk. Approximately, numbers 5, 9 and 12 in twisted silk and 4, 7 and 10 in braided silk are equivalent to numbers 1, 2 and 3 in catgut.

Makers of silk sutures supply sample cards showing the exact sizes in which they are obtainable, as illustrated below.



### The Tensile Strength of Silk Sutures

Silk is stronger than catgut of the same size, and it is not weakened by the ordinary processes of sterilization, or a variety of influences which tend to debilitate catgut and other sutures.

### Silkworm-Gut

Silkworm-gut is made direct from the silkworm, before it forms the cocoon. The silkworm is killed by dipping it into acetic acid. Its pouches are then opened by hand and their thick liquid contents drawn out between the fingers of the operator. It is, essentially, unspun silk. The bulk of this material is supplied from the provinces of Spain.

Silkworm-gut is a white, smooth material, but is quite stiff, and should be soaked in warm or hot water before attempting to tie it. This procedure has a tendency to prevent splitting.

The shortness of the strand of silkworm-gut limits its field of usefulness. The longest length ever produced is eighteen inches, the average length running from twelve to fourteen. There is no way in which this difficulty can be overcome. Neither can there be any accurate assortment as to sizes. The best that can be done is to supply it in what is known as "short," "medium" and "long" lengths, fine, medium or coarse, without any guarantee of greater accuracy in gradation.

In surgery, silkworm-gut is used principally for suturing the skin.

### Linen Sutures

These are formed of the twisted fibre of flax—literally, linen thread—and, ordinarily, are used in their original grayish-white form. Some operators, however, prefer the black linen cord.

Celluloid Linen—also known as "Pagenstecher Linen"—is linen thread impregnated with celluloid. This is to overcome capillarity and to prevent infection from being carried into the wound by the strand. The coating increases the tensile strength and overcomes any tendency to irritate. It also obviates the troublesome snarling and kinking occasionally occurring in silk strands.

Waxed Linen is linen thread coated with paraffin or with beeswax. Black waxed linen is usually preferred.

### Horsehair Sutures

These sutures are taken from the tail of the horse, and are prepared for surgical uses as follows: They are first subjected to a thorough cleaning with boiling water and soap, to remove the gross dirt. This is followed by repeated washing and sterilizing in hot water and steam. Owing to the liability of horsehair to the presence of tetanus and other organisms, a thorough sterilization is required.

No particular gradation of sizes for horsehair sutures can be made. They are usually supplied in approximately uniform lengths, packed in tubes or envelopes and sterilized within the container.

Horsehair is a fine, elastic substance with very little tensile strength. It can be used only for very delicate work. It is used chiefly for the suturing of the skin—particularly about the face, neck, lips, etc.—and leaves but little scar, or cicatrix.

### Silver Wire Sutures

These consist of drawn wire of silver mixed with copper. The alloy contains 985 parts of silver per thousand (985 fine), the balance being copper. Silver wire was used for ligature and suture work before the advent of catgut. It was supposed to have an antiseptic effect in the wound. As it cannot be knotted, it is fastened by twisting the ends. The main use for silver wire at present is for suturing the bones.

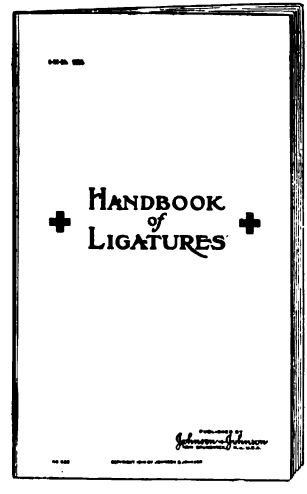
Wire sutures have been made of other metals—aluminum, bronze, etc. At present, however, they are but little used.

*(The next paper in this series will be devoted to catgut.)*

---

## A Handbook of Ligatures

An excellent volume of information on the subject of ligatures is the Handbook of Ligatures published by the Scientific Department of Johnson &




Johnson. A copy will be sent to any physician or nurse on request, with the compliments of the publishers.

# War Has Stimulated First Aid Study

## Physicians Who Are Constantly Being Called Upon to Assist with the Formation of Classes and to Outline Courses of Study Find the Service of the Johnson & Johnson First Aid Bureau Very Helpful

The extent to which the study of first aid has been stimulated by war is amazing. The call from the vast shipbuilding and munition plants and other war industries, working under the strain of "speed up" orders, for trained first aid workers has resulted in first aid instruction being made a part of the work of universities, training schools and training camps.

*Copyrighted by Committee on Public Information.*

Secretary of War Baker watching the arrival of a wounded American at an American hospital near the front in France.

The Red Cross, the Y. M. C. A., the Home Defense Guards and other organizations are teaching first aid. These war agencies, supplementing the work which has been done for years by the railroads, the mines, the police and fire departments of municipalities, the Boy Scouts and the Camp-fire Girls, have crystallized the importance and value of true first aid.

Physicians everywhere have been called upon to assist in the formation of first aid classes, to outline courses of study, to train first aid instructors and to generally supervise the instruction. They have found no lack of enthusiasm, but rather have had to guard against the over-enthusiasm of the first aid workers who occasionally go beyond the limitations of true first aid.

The fact that the treatment and care of injuries, the administration of medicine and the diagnosis and treatment of disease are no part of first aid work—that, on the contrary, they lie within the province of the physician exclusively—is often overlooked.

It is an established principle that the condition of the patient is prejudiced, rather than improved, when any other than the simplest temporary measures are adopted for his relief by first aid workers.

The First Aid Bureau of Johnson &

*Copyrighted by Committee on Public Information.*

Type of hospital in which the French administered first aid during the war. This one was within the zone of German fire. It contained all modern surgical appliances. Although only covered by a canvas roof, it had been decorated by the nurses in an attempt to make it appear more homelike to the wounded.

Johnson has been of material service to physicians in impressing this fact upon hosts of new first aid workers. In all of the first aid literature sent out special emphasis is laid upon the paramount necessity of enlisting the services of a qualified medical man in every emergency case. The assistance which this Bureau has been able to render to the profession, through its First Aid Manual, First Aid Chart and First Aid Instruction pamphlet, has materially aided in the organization and instruction of many classes.

In organizing class work the first thing to do is to select a reliable text book. It is interesting to note that the physicians, following the example of many institutions of learning, have chosen Johnson's Standard First Aid Manual. They found that this Manual, through its seven editions, has kept pace with the advance of first aid work, and that the eighth edition, recently published, while retaining all of the characteristic features of previous editions which have stood the severe test of practical experience and professional criticism, contains, in addition, all new information brought to light by the rapid development of first aid.

Instructors favor this Manual because technical terms have been avoided, because everything is placed before the readers in so simple and plain a form that anyone who can read English or understand a picture may gain information which will serve in an emergency.

They know that its teachings are sound, as a large number of first aid instructors of national reputation assisted the editor in its revision. They know that the illustrations are instructive, as they were posed for by first aid teams under the direction of trained workers.

Many instructors have found that their classes make greater headway when they use Johnson's First Aid Chart to illustrate the lessons under discussion.

This is a practical anatomical chart, covering the whole range of first aid in picture and text. It is mounted on heavy cardboard, 27 by 44 inches, and lithographed in ten colors.

Physicians and nurses, called upon to supervise first aid classes, have found it helpful to have in printed form an outlined system of instruction. In response to this demand, and without presuming to dictate the procedure or usurp the functions of qualified first aid instructors, the First Aid Bureau of Johnson & Johnson has compiled and published, in pamphlet form, a series of ten lessons.

The lessons outlined are based upon Johnson's Standard First Aid Manual and suggest a practical grouping of the following subjects:

The First Things to Do.
Bleeding.
Wounds.
Fractures.
Burns and Scalds.
Machinery Accidents.
Sunstroke, Fainting, Fits, Unconsciousness.
Sprains, Dislocations, etc.
Artificial Respiration.
Transportation of the Injured.

Besides the lessons this pamphlet contains practical suggestions for organizing first aid classes, reproduces in colors a miniature of the Johnson's First Aid Chart and outlines the service available to first aid workers.

Johnson & Johnson will gladly send a copy of this First Aid Instruction pamphlet to anyone sufficiently interested to request it. Johnson's Standard First Aid Manual will be supplied in cloth binding for 50 cents a copy, or in paper binding for 25 cents a copy. Johnson's First Aid Chart will be sent, carriage prepaid, for $3.00 each.

Physicians and others who may be called upon to act as instructors in first aid are cordially invited to correspond with the First Aid Bureau of Johnson & Johnson.

---

## Supplies for the Carrel Method of Wound Sterilization

Surgeons who are interested in the Carrel method of wound sterilization, by intermittent saturation of the wound by means of a specially devised solution of sodium hypochlorite, will find the Chlorin-Soda Ampoules the most convenient and accurate method of preparing the solution.

Following is a list of supplies for the Carrel method which are made by Johnson & Johnson and which may be obtained from druggists and physicians' supply houses:

CHLORIN-SODA AMPOULES.—One ampoule of liquid chlorin and one tube of sodium salts contain the exact amount of material necessary to prepare one liter of Carrel-Dakin solution of standard strength—.45% to .50% sodium hypochlorite. These items are supplied only in sets containing three ampoules of liquid chlorin and three tubes of sodium salts (sufficient for three liters of Carrel-Dakin solution).

AMPOULE HOLDER.—(Connected with rubber stopper) For holding the chlorin ampoule in the bottle when making the solution.

PROTECTIVE BAGS.—To cover five pint or half-gallon bottles, to protect user in case of breakage of glass bottle.

C. D. S. RUBBER INSTILLATION TUBES.—These are perforated, ends tied, and the perforated area covered with special absorbent Turkish toweling made for the purpose. Packed six in a box.

RUBBER INSTILLATION TUBES (plain).—Perforated and ends tied but not provided with diffusers. Packed one dozen in a box.

DIFFUSERS.—Made of special Turkish toweling manufactured for the purpose. Prepared in "tubes" twelve inches long, ready for application to perforated instillation tubes. These are extra diffusers to replace those removed by the surgeon and destroyed after each daily change of dressings. Packed one dozen in a box with a glass applicator to facilitate slipping them over the rubber diffusers.

BACTERIAL CHARTS.—As designed by Dr. Carrel for charting the bacterial "count" by which the point of approximate sterility is determined. No charge.

# Antiseptics Are Being Re-enthroned

The pendulum is swinging back toward a modified form of antisepsis. The surgery of the great war, with its vast experience in the treatment of injuries, is responsible for the new technique, and civil practice, both here and elsewhere, has verified the wisdom of the change.

Witness, for example, the widespread use of the Carrel-Dakin solution of hypochlorites, and of the various forms of chloramine paste, and solutions and gauze, and of a somewhat extended list of antiseptics, all applied under the newer and better knowledge whlch experience has taught.

Many operators think it is quite possible that the war may bring about an extended use of antiseptic dressings in surgery, and they note, as significant, that the medical departments of the various governments are using large amounts of antiseptic dressings. While it is true that aseptic procedures will not be abandoned, it is more than probable that they will be combined with the use of antiseptics.

Dr. John O'Connor, medical adviser of the British Hospital of Buenos Aires, in a recent article, goes as far as to pay extended tribute to the use of bichloride of mercury, as a result of three decades of hospital practice. He finds it an efficient non-irritant antiseptic for the sterilization of the hands, the skin of the patient, and for the maintenance of the tissues in an aseptic state until physiological repair has taken place.

He has found it necessary in many cases, especially in abdominal work, to abandon the use of iodine, and he now follows the method of shaving and scrubbing the field with soap and water (Synol Soap would find its use here—Editor), then washing with alcoholic mercurial solution, applying a large layer of sterile linter gauze containing bichloride of mercury.

The dressing is removed on the operating table, and the field is given a final washing with mercurial solution, before the dry towels are applied to isolate the part. He uses hot bichloride of mercury fomentations, alternating every three or four hours with hot hydrogen peroxide lotions, followed by hot carbolic lotions; these for the "desperately" infected wounds.

He states that bichloride of mercury fomentations, or compresses, applied hourly, except when the patient is asleep, is the most effective and rapid method of curing a carbuncle; that it renders the use of the knife unnecessary. He advocates the use of bichloride of mercury in low strength.

Dr. O'Connor maintains that for septic wounds no treatment equals those which were outlined by him in a recent number of "Annals of Surgery." Uniformly, he had found an early but not sudden discharge of purulent matter, followed by rapid healing.

## Treatment of War Wounds

The Journal of the American Medical Association, in a review of the work of Sir Almroth Wright in respect to the treatment of infected wounds received in battle, states:

"At this time the most successful method for the reduction of infection in wounds appears to be that of Carrel."

Sir Almroth Wright himself states that he regards the Carrel method as "by far the most important contribution to surgical technique since the beginning of the war."

The basic principle of the Carrel method is to reduce the infection to a

point where healing proceeds without delay after approximation of the edges by sutures or otherwise. As we understand it the method does not consist simply of flushing the wound with an antiseptic; it is a combination of procedures by which the chemical substance is used in specific continued contact, concentration and duration, under microscopic control. It is possible that sterilization would tend toward making an early closing of the wound possible.

According to reports by Carrel and others it is possible to secure by this method complete sterilization of infected shell wounds; in other words, it seems that chemical sterilization of infected wounds may be accomplished.

Carrel started on the use of the Carrel-Dakin Solution after having tried several other disinfecting fluids, finding that this gave the most satisfactory results. Whether the action of this fluid is due solely to its direct disinfecting power or to its physiologic properties, discussed by Sir Almroth Wright, is an open question which can be studied with profit. In any event there can be no question that Carrel's method marks a long step in advance in the treatment of local infection.

---

## A Complete Outfit for Baby's First Dressing

"From one-quarter to one-third of the pupils admitted to the schools for the blind have lost their sight from infection acquired at birth or during the first ten days of life, and there are innumerable other cases of those who are partially blind from the same cause. The responsibility for this appalling condition rests with the nurse, midwife or physician who had charge of the confinement," states F. Park Lewis, M.D.

This danger of blindness from ophthalmia neonatorum arises from the lack of proper material at the time of birth. In many families material for cleansing the umbilical cord and for cleansing the mouth, nose and eyes is seldom at hand when wanted, especially where the birth is in charge of a nurse or midwife.

To meet this need Johnson's First Dressing for Infants has been prepared. This outfit meets all these needs. It also fulfills the requirements of the growing number of States which require the use of prophylactic measures in cases of babies' sore eyes at the time of birth. Nearly thirty States require cases of babies' sore eyes to be reported to the Board of Health; eighteen require or recommend prophylactic measures.

This outfit also meets the recommendation of the National Committee for the Prevention of Blindness. Many medical organizations have recommended the use of such an outfit.

The Johnson's First Dressing Packet contains the following items:

One envelope containing two sterilized tapes for tying the umbilical cord.

Two gauze pads (one with perforations) for dressing the umbilical cord.

One package boracic acid for cleansing and disinfecting the umbilical cord and eyes.

Two small gauze pads for cleansing the eyes, mouth, etc.

Three pieces of sterilized absorbent cotton for cleansing the eyes and dressing the cord, etc.

One ampoule of nitrate of silver solution (one per cent.) for instillation into the infant's eyes when necessary.

One flannel binder for holding the umbilical cord in place.

Three safety pins.

One miniature package of Johnson's Toilet and Baby Powder for use after the infant's first bath.

One miniature bottle of Synol Soap for the bath, cleansing the hands, etc.

One chart for making the birth record.

Full directions accompany each item and a circular in each packet gives instructions to the nurse or midwife.

# Linton Gauze Bandages in Cylinders

The most convenient and economical form of gauze bandage in these times is **the J & J Linton** Gauze Bandage, packed in a sealed cartridge carton. It can be carried in the grip or pocket; it is perfectly protected from infection while handled; it is sterilized—fit to apply directly to the wound.

This style of packing, used only for Linton Gauze Bandages, keeps the bandages aseptic indefinitely.

Linton Gauze Bandages are made in a surgical dressing laboratory, from the finest grade gauze of well spun thread. They are tightly rolled; they are full width and length, as specified on the label.

The sizes of the bandages include Finger Bandages, one inch by three yards, and all widths from one to four inches in ten-yard lengths.

The range of sizes of Linton Gauze Bandages.

Linton Gauze Bandages in cylinders are sold by count only—not by weight. The former method of selling bandages by weight made it difficult for the dealer to arrive at a correct re-sale price.

A good exponent of the new method is the Government itself, which uses many million bandages, and whose specifications require them by count.

Hospitals and physicians will serve themselves by requiring that bandages be supplied to them of a specified length and width, and by count, not by weight.

## The Miracle of Dust

Dust is an important factor in almost every phenomenon of the earth's atmosphere. It is due to dust that the heavens are blue. Without it the heavens would be blacker than we see them on moonless nights. It is especially on mountain heights that the sky is so intensely blue, because the rarefied atmosphere supports only the finest particles. Dust plays a most important role in our atmosphere in determining rainfall, due to the fact that vapor fluidifies upon the dust particles.

Without dust we would have no fog, no rain, no snow, no purplish sunset, no cerulean sky. The surface of the earth itself, the trees, the houses, along with man and beast, would be the only objects on which the vapor could condense, and these would begin to drip whenever the air was cooled sufficiently. In winter everything would be covered with a crust of ice, our clothes would become saturated with water condensing upon them. Umbrellas would be of no avail. In short, the world we live in would be quite another world if there was no dust.—*Literary Digest.*

## To Destroy the Nits

It has been found that cresol soaps, such as Synol Soap, are effective in the destruction of the nits of the clothes louse. The clothes should be soaked for a half-hour in a five per cent. solution, and the temperature should be above 60° F.

## "Influenza" Is Italian

The word "influenza" is of Italian origin. It signifies "influence," and was originally applied to astral or occult influence supposed to be the cause of a visitation of a disease on an epidemic scale. Formerly any epidemic was an "influenza" under the "evil influence of the star." Now the use of the word is restricted to the epidemics of feverish catarrhs usually prevailing in winter and spring.

## Origin of Smallpox

It is believed that smallpox was first recognized as a disease in Asia. In China references are made in writing, 1122 B. C., to a disease presenting the symptoms of smallpox. In ancient Sanskrit literature there are records of fatal epidemics of unknown origin and name, which were prevalent in India and Persia at least five thousand years ago. In the sixth century of the Christian Era it was described by Aron, an Egyptian physician, who wrote of smallpox specifically, and differentiated it from measles.

## Favors Chloramine Gauze

Dr. Fremont W. Frankhauser, of Wernersville, Pa., reports that he has used chloramine gauze on carbuncles, abscesses and large boils, where the cavities were large enough to pack. He states that it always cleans out and arrests suppuration, promoting healthy granulations, and that the opening closes up very fast. He has never used anything, he says, that arrests suppuration as quickly as chloramine gauze.

## Castor Oil in Dressings

We are swinging back to Lister in the adoption of castor oil for the dressing of wounds. Lister's earlier dressings had castor oil as one of the constituents.

Busy physicians will find concise facts about blistering in "Blistering Time Table," a 24-page booklet issued by Johnson & Johnson. Sent free on request.

# LUBRICATING THE MEMBRANES

Suggests the "line of least resistance" invariably followed by catheter, sound, speculum, 'scope and digit when adequately coated with

**"K-Y" LUBRICATING JELLY,**

the cleanest of surgical lubricants—non-soiling, non-staining and water soluble.

"K-Y" Lubricating Jelly is "Friction's Antidote" for all instruments of penetration, and softens and protects the surgeon's hands from irritation.

Samples on Request EFFECTIVE - ECONOMICAL Of all Druggists

JOHNSON & JOHNSON—Van Horn and Sawtell Department
15-17 East 40th Street, New York City

---

# "EIGHT FEET OF TROUBLE"

is the intestinal canal.

Obstipation——Stasis——Autoxemia
claim victims by the score.

Treatment, to be efficient, needs lubrication.
Effective lubrication requires

**INTEROL**

by reason of its correct body, effective viscosity, and freedom from suggestion of flavor or odor, even when heated to 100°C.

INTEROL secures results in hands that
KNOW HOW—and WHEN—to use it

JOHNSON & JOHNSON—Van Horn and Sawtell Department
15-17 East 40th Street, New York City

# "ZO" Adhesive Plaster in Modern Surgery

"ZO" Adhesive Plaster, on account of its cleanliness, convenience and freedom from irritating qualities, has been pronounced by numerous authorities to be the most suitable of all adhesive plasters for general surgical purposes.

It is not affected by heat, cold or moisture. It is perfectly flexible, conforming to any part of the body. The mass is spread thin and is firm, tough and unchanging. It is non-irritating; in fact it is emollient and healing.

**ON SPOOLS**—*Plain only*

2½ yards x ½, 1, 1½ inches wide
5 yards x ½, 1, 1½, 2, 2½, 3, 4 inches wide
10 yards x ½, ½, 1, 1½, 2, 2½, 3, 4, inches wide

ON STRONG COTTON CLOTH—1 yard x 7 inches and 5 yards x 7 inches, plain or porous. 5 yards x 12 inches, plain only.

ON MOLESKIN, plain only—1 yard x 6½ inches, 5 yards x 6½ inches, 5 yards x 12 inches.

The good results attained in the application of "ZO" Adhesive Plaster, where the application has been prolonged, such as in fractured clavicle in delicate women and children, have been so pronounced as to give to this plaster a positive and deserved success.

An eight-page booklet, descriptive of "ZO" Adhesive Plaster, will be sent free on request.

JOHNSON & JOHNSON
New Brunswick, N. J., U.S.A.

**"ZO" CHIROPODIST STRIPS**

2 ins. x 5 yds. on spool, cut in strips of either ⅛ or ¼ in. wide. Each spool in a wooden box.

656

Series VII Number Eleven

# RED CROSS NOTES

PUBLISHED BY
Johnson & Johnson
NEW BRUNSWICK, N. J., U.S.A.

Copyright 1919, Johnson & Johnson

## SAFEGUARDING THE SURGEON'S CONFIDENCE

Here is shown a sectional view of the Scientific Department of the Johnson & Johnson laboratories. Its duty is to see that every manufactured product is worthy the full confidence of the surgeon. It has constant supervision of the manufacturing processes, from the inspection of raw materials to examination and standardization of finished products.

# Red Cross Cotton—the World's Standard

Red Cross Cotton is put up in the following sizes: One-pound, half-pound, quarter-pound, two-ounce, one-ounce and half-ounce. It is packed in blue cartons.

RED CROSS COTTON is today recognized as the standard for the world's production, a standard which is imitated and striven after, but which stands in a class by itself.

It is made of carefully selected fibre, it is protected from infection throughout the various stages of manufacture, it is sterilized after final packing, and it is so packed that it remains sterile.

Red Cross Cotton is the only absorbent cotton that is so wrapped that all surfaces, including the edges, are fully protected from dust, dirt and infection, whether in or out of the carton. This enables the user to cut as much from the roll as is desired without touching the remainder, insuring a perfect aseptic condition of the roll until the last particle is used.

In a pound package of Red Cross Cotton there is a pound of absolutely perfect cotton fibre, exclusive of the weight of tissue or other wrappings. Every other size package, even to the smallest ounce or half-ounce, contains the full net weight.

*Sold by all druggists and physicians' supply houses.*

JOHNSON & JOHNSON, New Brunswick, N. J., U. S. A.

# RED CROSS NOTES

COPYRIGHT, 1919, BY JOHNSON & JOHNSON

SERIES VII NEW BRUNSWICK, N. J. NUMBER ELEVEN

Fred B. Kilmer, Editor

This publication is issued from the laboratories of the publishers with the intent to give, in brief, items of interest and reports of original research along the line of the particular branches of the art in which they labor.

Persons receiving *Red Cross Notes* will confer a favor by notifying the publishers of any inaccuracy in the address on the wrapper and of any change of their address.

## There Is No Substitute for Confidence

During the war, necessity became the mother of substitution—some good, some bad and some just neutral. Surgeons found paper being substituted for gauze in bandages, and paper pulp and moss for absorbent cotton.

With peace came other forms of substitution, born of the necessity of finding new outlets for the products of organizations engaged in the manufacture of war goods. And the surgical dressing line has not been overlooked in this form of substitution.

There is no room for hit-or-miss mechanical methods in the manufacture of surgical dressings. It is not a business which can be assumed overnight to meet the exigencies of changing conditions—to fill a gap. There must be no room for doubt about surgical dressings. They must command the confidence of the surgeon.

In no boastful spirit it may be said that for thirty years Johnson & Johnson surgical dressings have enjoyed this confidence. War conditions did not disturb it. Substitution has never gained a footing in the Johnson & Johnson establishment. The high standards adopted years ago have always been maintained.

From the beginning Johnson & Johnson have held firmly to the principle that materials used for wound dressing, for the conservation of life itself, must be so made and marketed that they are fit for the most delicate uses of surgery, and worthy the full confidence of the surgeon.

The growth of the business has simply been the result of an ever-widening circle of confidence, now reaching to the medical profession of every civilized country.

In this issue of the Notes some space is devoted to a description of manufacturing processes which have helped to command this confidence, and attention is also drawn to the enlarged facilities, made necessary by the rapid growth of the business.

# How Surgical Dressings Are Sterilized

## By Installing the Highest Type of Apparatus and Maintaining a Rigid System, the Johnson & Johnson Laboratories Secure Absolute Sterilization of Their Enormous Output of Cotton Fibre Products

Physicians who have visited the Johnson & Johnson factories have been particularly impressed with the processes of sterilization. They had often wondered how a manufacturer who produces bandages and other surgical dressings by the hundreds of millions could be as positive as Johnson & Johnson are that every dressing sent out as sterile is sterile.

After seeing how the sterilization is applied under the most rigid system and by the use of the highest type of apparatus, they have suggested that the profession in general would be keenly interested in this subject.

It is generally known that Johnson & Johnson have the distinction of having been the first to introduce sterile surgical dressings in a commercial way years ago, and it is also recognized that their laboratories to-day are producing these dressings on the largest scale and that these dressings are recognized as the standard of the world's production.

These dressings pass through several stages of disinfection and sterilization. They are manufactured under aseptic—surgically clean—conditions, and as a final safeguard they are sterilized within their containers.

To-day it requires eight large sterilizers, each having a capacity of twelve thousand bandages at a single operation, to take care of the output of these laboratories. The sterilization apparatus in use is no doubt the largest and most complete in the world, and its germ-destroying capacity is marvelous.

The processes and apparatus are the result of extended research. Steam and formaldehyd vapors are the germ-destroying agents employed, and by the use of vacuum chambers penetration of the fibre is secured, and hence absolute sterilization.

### Steam Sterilization

The sterilizing chambers may be described briefly as follows:

They are rectangular in form, constructed of thick walls of metal, asbestos and other non-conducting material. They are surrounded by a steam jacket for producing heated air within the chamber. The doors to the chamber open at both ends, the one end to receive the unsterilized goods and the other end to discharge them. Cars of iron, with trays, carry the products to be treated. Supply pipes, controlled by valves, admit the live steam to the interior of the chamber. The actions involved within the chamber are:

a. Preliminary warming of the material to prevent condensation.

b. Removal of air.

c. Circulation of saturated steam, unmixed with air and under pressure, through every fibre of the material, subjecting them to the highest possible action of this agent.

d. Subsequent exhaustion of steam and substitution of heated air.

After the gauze or cotton passes into this chamber, the doors are closed, and the chamber is soon heated with hot air. The air is then exhausted to a vacuum, and saturated steam is admitted. The temperature quickly rises to a possible 250 degrees, and the pressure gauge indicates 15 pounds. The steam pipes are now closed and the vacuum pump is again operated, until a proper vacuum is obtained. In turn currents of satura-

Battery of steam vacuum sterilizers (five of this style in use). The sterilization is carried on in a special room, with tile floor and walls. This room forms a connecting link between the manufacturing and packing departments. All goods pass outward through this battery of sterilizers. The capacity of each sterilizer is twelve thousand bandages at each operation.

ted steam follow each other through the vacuum for from a half to one hour. Every part of the chamber is penetrated, every fibre is subjected to the action of this highest of bactericides, and the most resistant form of germ life is reached and destroyed.

### Formaldehyd Sterilization

The same chambers are used for the application of formaldehyd vapors to such dressings as might be injured by moist steam. In the use of the formaldehyd, the warm, moist formaldehyd gas passes into the vacuum chambers and the result is an immediate and effectual penetration of the fibres.

The whole operation is directed and controlled by the Bacteriological Laboratory. Sterilization is the final process. There is no manipulation after sterilization.

## Some Good Things from the War

The great world war furnished many horrors, but, as is usual, also developed a few good things which are now coming to light.

### The Geophone

One of these good things is a listening device called a geophone. This instrument, as its name indicates, records any tremor of the earth. In warfare the geophone records the tremor of the earth caused by gunfire.

The apparatus was developed in the United States and is so delicate, it is stated, that it registers the dropping of a pin on the floor with the same accuracy as it would record the discharge of a gun.

It is proposed to use it on the rescue cars connected with mines in order to locate miners who may be imprisoned within the tunnels. It is stated that the slightest movement made by the men in such an accident can be recorded by the geophone, and thus their location discovered readily by the rescuing party.

### The Microphone

Another instrument developed along the same lines is the microphone, intended to be used as a method of signaling a warning to workers in the mines. In the past, when an accident occurred in the mines, it has been difficult to pass the warning from one end to the other. Now, in the event of danger, a preparation with a peculiar odor is put into the pipes charged with compressed air, and as soon as the miners perceive this odor they know that it is time to quit the mines.

### A Mask for Miners

Still another war development is the invention of a breathing apparatus for miners. This is constructed along the lines of the breathing masks used in the war, which consist of a face mask connected by a long tube to a tank of oxygen. By the means of this apparatus a man can live two hours in an atmosphere which, without this protection, would kill him in a minute.

The necessity for the protection of armies against poisonous gases has led to the development of the gas mask. So efficient is this mask that it is stated that if the men were gassed it was due to their own carelessness in adjusting the mask.

These masks are adaptable to our chemical industries to protect the workers from the deadly chemical fumes often let loose in the factory. It is stated that in the development of poisonous gases several important chemical discoveries have been made which will be of great value to American industries.

---

## Health Insurance in England and Germany

The experience of England and Germany with Health Insurance will furnish food for thought for those who, without due consideration, are urging State Health Insurance laws in this country.

### In England

Sir Bertrand Dawson, of England, recently discussed the future of the medical profession, especially in relation to Health Insurance. He stated that the position of the physician in England is far from being an enviable one and that certain reforms are greatly needed. The physician is overworked and underpaid, and the influence of the profession as a whole in public affairs is practically nil.

The present condition of the profession is not the result of war but the outgrowth of many antagonistic conditions, not the least of which is the National Health Insurance Law. Many physicians who are doing panel work under this Health Insurance Law, even with hard work, are unable to earn more than one hundred and fifty pounds per year ($750).

The proposition has been made to make the panels larger. While this would merit a greater return it would simply reduce the practice of medicine to a test of physical endurance without any regard for brain or ability.

### The Failure in Germany

No less an authority than Mr. Frederick L. Hoffman, of the Association of Life Insurance Presidents, has reached a strong conclusion against the workings of compulsory health insurance. He states that compulsory social insurance rests upon profound misconceptions of life and labor in a democracy, for it involves the establishment of permanent class distinctions.

After thirty years' trial in Germany,

## Make Thrift a Happy National Habit

Thrift must be encouraged as a happy, everyday national habit of the American people.

It is a duty we owe the nation. The war bills must be paid, our troops abroad must be maintained, our soldiers must be brought home and restored to social and industrial usefulness, and the helpless, maimed, sick and wounded must be reconstructed.

Thrift makes wages yield the maximum in commodity, comfort, service, recreation and advancement.

Thrift will clearly make for family stability, increase individual credit and buying power and will directly and necessarily contribute to community and national wealth and prosperity.

The best way to teach thrift is to urge the systematic buying of War Savings Stamps. It is a movement worthy the heartiest support of every physician.

compulsory health insurance has not improved the health of the working people of the community or the standard of public health, while financially at the present time it is in a condition of chaos. It has led to dishonesty and deception on the part of patients, druggists and physicians, with the general undermining of the morale of the community. It has not checked the spread of socialism.

In the field of sanitary welfare, the United States has, in the last thirty years, advanced more rapidly without social insurance than Germany has with it.

The condition of the medical profession in Germany has not been improved, but on the contrary the ethical standards of the profession have been perceptibly lowered. The German experience proves the inadequacy of social insurance as an effective means of securing the required degree of continuous social progress demanded by modern standards of labor and life.

### Useful During Epidemics

Physicians and boards of health occasionally need simple and complete printed instructions, as to isolation, sanitation and care of patients, for general circulation, especially at the time of epidemics. Johnson & Johnson have issued the following publications for such a purpose and will furnish copies on request:

CONTAGIOUS DISEASE BULLETINS.—A series of six pamphlets written from the standpoint of the best authorities upon sanitation and embracing the latest and best-known methods used by Health Boards to combat communicable diseases. The Bulletins are as follows: Diphtheria and Scarlet Fever Bulletin, No. 28; Typhoid Fever and Allied Diseases Bulletin, No. 29; Infantile Paralysis and Meningitis Bulletin, No. 38; Whooping Cough and Measles Bulletin, No. 40; Consumption Bulletin, No. 56, and Smallpox Bulletin No. 57.

A BOOK WITH A MISSION, No. 18.—A forty-page book with directions for the prevention of the more contagious diseases.

# The Unique Office of Dr. Urrutia

## The Dreams of Artists of Four Centuries Seem to Have Furnished the Inspiration for the Beautiful Quinta Urrutia, with Its Open-air Reception Rooms and House of Jewels

Picturesque in its surroundings and unusual in its appointments is the residence and office of Dr. Aureliano Urrutia, at San Antonio, Texas. The romance of Mexico, the quaint architecture of the Aztec and the Toltec Indians, the lavish decorative art of the early Moors and the dignified beauty of the old Mission San Jose are reflected in the structure. Here are blended into a most harmonious realization the dreams of artists of four centuries.

"Quinta Urrutia" is the inscription over the portal of this unique mansion, and it well describes the place, "quinta" meaning a mansion surrounded with gardens.

The patio, or court, is a marvel of ingenuity. Just as long as the sun sends its beams to Mother Earth, this patio will remain a sun-flooded corridor.

The corridor is notable for its brilliant Saracenic colonnade. Majestic white columns rise from red cases and are surmounted by red capitals upholding the horseshoe arches and their center above the spring line.

Mosaic tile and broken lines, in alternating colors of white, gray and red, suggestive of oriental architecture, decorate the top of the cornice.

In the center of the patio, Dr. Urrutia has built a shallow fountain, recalling the famous Court de Lyons fountain of the Granada Moorish monument in Spain.

The entrance to the building is through a vestibule which gives access to all rooms. Each room has two doors, the one opening into the patio on one side and the other into the garden on the opposite side. Upon the walls of the rooms hang paintings by Spanish artists.

A noval summer house, constructed of Johnson & Johnson Iodoform Gauze jars, adorns the grounds. The walls of this house were made by filling the jars with plaster and setting them upon each other in the form of tile brick. The amber color of the jars reflects a pleasing light from the sun and makes the house appear as if it were made of jewels. Twenty thousand jars were used in its construction. It was not a very difficult task for Dr. Urrutia to collect this number of this particular jar, as he uses a great many of Johnson & Johnson's goods.

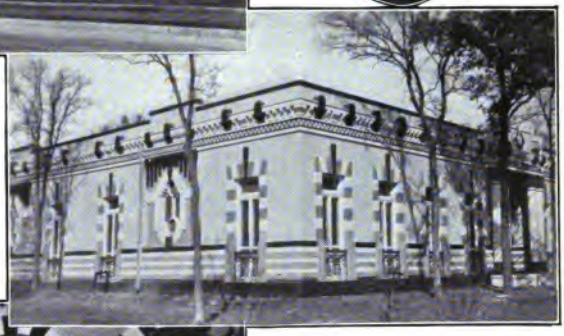
The office is not like the ordinary office. There is an open-air reception room in the corridor, and a music room for those who may wish to amuse themselves while they are waiting their turn to see the doctor. There is another open-air reception room where men can smoke and talk. The beauty of the place is enough to drive many pains away.

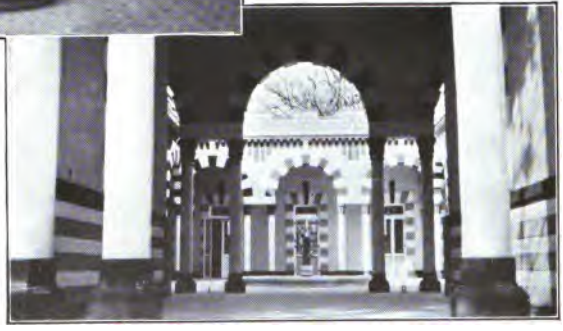
Dr. Urrutia was formerly on the staff of General Huerta, but during the revolution in Mexico he was obliged to leave that country, like many other of Mexico's noted men. His medical education was obtained in France.

Dr. Urrutia's family consists of four sons and seven daughters. Two of his sons are medical students at the Tulane University.

Incidentally, Dr. Urrutia uses Johnson & Johnson catgut for his sutures and ligatures, and says that it is "the best in the world."

Views of the "Quinta Urrutia" are shown on the opposite page, together with a likeness of Dr. Urrutia. These pictures give an idea of the beauty of the building and court.





From top to bottom: 1—Quinta Urrutia, showing main entrance. 2—Dr. Aureliano Urrutia. 3—Side view of mansion, showing window copied from old Mission San Jose. 4—Interior court, showing fountain. 5—Looking into court, or patio, from the main entrance.

# Gauze in Rolls for Hospitals

There is a marked variation in the gauze cloth offered in the market for surgical purposes; the quality of the fibre, firmness of thread, number of threads to the inch, weight of thread, all varying in each brand. In certain instances it has been found that surgical gauze is supplied to hospitals 30 to 33 inches wide, although sold for full 36-inch width; and that bolts marked as 100 yards actually measure but little more than 90 yards.

Gauze for surgical uses should be especially made for the purpose; it should have a soft, even thread and contain no kind or sort of filling or dressing, and it should be standardized as to mesh, quality and size. These requirements are assured in the Johnson & Johnson product.

Surgical gauze in 100-yard lengths. Here are shown the three sizes of packages: 36-inch flat, 18-inch round and 18-inch oval.

Surgical gauze in 25-yard lengths. Packed in cartons, sealed and sterilized.

The standard mesh of Johnson & Johnson gauge is as follows:

Brunswick Gauze...20x12 threads to inch
Rutgers Gauze.....20x16 threads to inch
Jersey Gauze.....22x18 threads to inch
Raritan Gauze.....24x20 threads to inch
Belleview Gauze...28x24 threads to inch
Red Cross Gauze...32x28 threads to inch
Bandage Gauze.....44x40 threads to inch

All of these different meshes are supplied 36 inches wide, sterilized and sealed. The 25-yard rolls are packed in cartons, folded and rolled to 9-inch widths; the 100-yard rolls are folded and rolled to 18-inch widths.

Gauze prepared 18-inch simply means that the full 36-inch material is folded once lengthwise and then wound tightly in a round roll, or wound more loosely over cardboard which makes the oval.

Surgical gauze in 100-yard lengths, with outside wrapping removed. The top figure shows the gauze folded to eighteen inches and wound tightly into a roll; the middle figure shows the gauze folded to eighteen inches and wound in the oval on cardboard, the bottom figure shows a bolt of gauze in full-yard width, folded back and forth to a yard square.

The 36-inch gauze is the full yard width folded back and forth to a yard square.

Each weave is guaranteed standard width, size, as to count of threads, weight and measure.

### Gauze in Case Lots

In one-case lots and upwards, in one shipment, Johnson & Johnson surgical gauze in 100-yard lengths is supplied as follows:

Brunswick Gauze .....3,000 yds. in case
Rutgers Gauze.....3,000 yds. in case
Jersey Gauze.....2,500 yds. in case
Raritan Gauze.....2,500 yds. in case
Belleview Gauze.... ..2,500 yds. in case
Red Cross Gauze.....2,500 yds. in case
Bandage Gauze.....2,500 yds. in case

Gauze in 25-yard length is supplied in case lots as follows:

Red Cross Gauze.....25-carton lots
Belleview Gauze.....25-carton lots
Raritan Gauze.....25-carton lots
Brunswick Gauze.....25-carton lots

## Physicians' Descriptive Catalog

The Physicians' Descriptive Catalog is a 125-page book containing terse descriptions and accurate illustrations of

the principal Johnson & Johnson products. Every physician should have a copy handy. Sent free on request.

---

—A mustard plaster applied to the stomach region often arrests nausea and vomiting.—*Medical Summary.*

# The Johnson & Johnson Cotto

This plant, which has a capacity of about one million yards of
In the foreground are shown some of the model homes erected

In addition to the extensive Red Cross Cotton Mills at New Brunswick, N. J., Johnson & Johnson now operate a group of cotton mills at Chicopee Falls, Massachusetts. This factory had previously been used for the purpose of spinning and weaving cotton cloth.

Upon acquiring it in 1916 Johnson & Johnson at once adjusted the machinery for the manufacture of surgical gauze. Fortunately, the whole of the plant was ready to produce surgical gauze at the time of the declaration of war by the United States against Germany, and during the war these mills were devoted entirely to supplying the United States Army and Navy and the Allied forces.

It may be truly stated that without the equipment of Johnson & Johnson at New Brunswick, N. J., and the added facilities of the mills at Chicopee Falls, the United States and Allied forces would have been unable to obtain surgical dressings in sufficient amount when needed for their use.

The plant consists of more than fifteen buildings. The machinery is operated by electric power, generated by water from Chicopee Falls dam on the premises. The factories have eighty thousand spindles, and nearly two thousand looms. They consume about two hundred bales of cotton per week, and have a capacity of about one million yards of gauze weekly.

The products of this mill are prepared exactly in the same manner as at the Johnson & Johnson factories at New Brunswick. After

# Mills at Chicopee Falls, Mass.

l gauze weekly, was acquired by Johnson & Johnson in 1916.
onvenience and comfort of the mill operatives.

The spinning department of the Chicopee Falls Mills, a section of which is shown here, has eighty thousand spindles and consumes about two hundred bales of cotton a week. A pound of cotton will spin about twenty miles of thread. The spun threads are, in turn, passed to looms to be interlaced and interlocked into gauze cloth.

the spinning and weaving, the surgical gauze and lint is sent to New Brunswick to be rendered absorbent and to be made up into surgical dressings.

# Ligatures and Sutures

## PAPER II

*(Contribution from the Scientific Department of Johnson & Johnson)*

This is the second installment of a series of papers upon the nature and properties of the various materials which are used in surgery for ligating and suturing. They have been prepared in response to numerous requests, and in the form presented will undoubtedly be found of service to students, nurses and others who have to do with this class of material.

### Historical Notes

It is a matter worthy of remark how long a road the ligature had to travel before it was established as the best and surest means of checking hemorrhage. It is quite probable that the first use of ligatures for the control of hemorrhage, as well as for the closure of wounds, is of very remote origin.

Jubal Cain, who is credited with being the maker of the first crude surgical instruments, is believed to have fashioned a form of cord made of tendon for use in primitive surgery.

Rufus of Ehesus, who lived in the first century, was acquainted with the use of ligatures.

Celsus gives to an obscure physician of the Alexandrian School credit for their discovery, and Galen mentions them in his writings. In any event, ligatures were known before the beginning of the Christian era, but their use seems to have been obscured for many centuries.

One of the first notices of the application of a ligature is given by Susrutas in his Ayar Vedas (1500 B.C.).

Celsus (30 B.C.-45 A.D.) applied two ligatures to the bleeding vessel and divided it between them.

Aetius (500-550 A.D.) ligated for aneurysm, excising the sac, although he used a red-hot iron to stop bleeding in excision of the breast.

Paré, the celebrated French surgeon, in the sixteenth century demonstrated the use of the ligature for tying.

Kirkland (1721-1798 A.D.) asserted that "nothing can more powerfully intersect the course of the blood than a ligature." He advised the use of the ligature made of long "twelve-penny flax" with the end waxed so that it would pass through the eye of the needle.

Sharpe, a surgeon of Guy's Hospital in London, suggested the use of the ligature in 1761.

In the early use of the ligature, suppuration was considered necessary in order to facilitate its removal, for which purpose both ends were brought out of the wound. Later, some surgeons cut off the ligature close to the knot, but it was discovered that the ligature, after performing its duty, created an irritation and led to the development of an abscess.

In 1889 Agnew stated that "the knots not being aseptic act as irritants, retard healing, provoke abscesses and are subsequently discharged from the wound. So the plan of cutting both ends of the ligature close to the knot may be regarded as an unsurgical procedure."

Philip S. Physick (1768-1837) was one of the early users of animal sutures. He used dog-skin and chamois cut into strips.

For three centuries after Paré, little improvement was made in the method of using ligatures.

Early in the nineteenth century silk was employed for buried sutures and for wound closure. The celebrated Dr. Physick, of Philadelphia, employed ani-

mal ligatures made from deer skins, chamois, and the so-called catgut.

McDowell tied the pedicle in his ovariotomy cases and closed the wound with the ligature.

Joseph Lister, during his experiments leading up to the antiseptic treatment of wounds, adopted buried ligatures, for which he used twisted strips of peritoneum from the ox; afterwards he used violin strings.

The use of absorbable animal tissue for ligatures and sutures produced a profound impression upon the practice of surgery.

Lister's method of preparing the cord was soaking in oils—mainly oil of juniper impregnated with carbolic acid. Since his day hundreds of processes have been devised for the preparation of surgical ligatures and sutures. The final outcome has been the sterilized or aseptic product.

### Catgut

Catgut is not, as its name implies, derived from the intestines of felines. Its source is the small intestines of the sheep. Surgical catgut is descended from the musical string and it is believed that the ancient makers of these strings employed the intestines of the cat and other animals.

The term "catgut" is also explained upon the basis that the word itself was originally derived from "kitgut," or "kit-string," meaning a fiddle, and this term has become confused with "kit," meaning a little cat. But, in any event, modern catgut is really sheep gut.

The ordinary manufacture of catgut for the purpose of ligatures or for musical strings belongs to a class of disagreeable industries called by the French "Boyauderie." Abroad it is considered a most unwholesome and unhealthful occupation, requiring constant supervision to abate the nuisance arising therefrom.

The supplies used in the United States were formerly largely obtained from Italy, France and Germany, with a few from Great Britain. During recent years there has developed an American production.

The quality of the strings produced is influenced by the climate and the condition of the animal.

Besides musical and surgical strings, other articles of commerce are made of the same material, such as sausage casing, strings for use in textile industries, racket strings, etc.

As ordinarily practiced, in the conversion of a piece of intestine fresh from the animal the possibilities of infection and contamination are very great. No attempt is made to avoid infection and contamination, and, as a matter of fact, the best made strings are sold at a high price for other purposes than for surgical gut.

### Usual Process of Manufacture

The usual process of manufacture is somewhat as follows: The small intestines of sheep arrive in barrels or other suitable receptacles.

The gut is first washed in tubs of water and passed between rollers. This process removes the contents of the intestines with some of the villi of the mucous layers. The intestines are then washed in an alkaline solution to loosen up the muscular and mucous layers.

By a process of passing the intestines between drums, similar to a clothes-wringing process, the mucous layers are squeezed out, this, of course, requiring alternate washing in water and squeezing until the intestine is deprived of all of its coat save the submucous layer.

It will at once be seen that the quality of the catgut depends upon the thoroughness of this process.

The villi are finger-shaped projections of mucous membrane composed largely

of a network of capillary vessels, soft and spongy and of no value in the finished string. If they are not removed, the string when finished is, of course, larger in size but materially lacking in tensile strength. Furthermore, as these villi harbor and hold numerous forms of bacteriological life, from a surgical point of view their removal is essential.

### Twisting Catgut

In the best made strings the catgut is split into two half cylinders, and after being split is again cleaned and scraped, and the various sizes of catgut are made by taking a number of tubes or half tubes and twisting them together. The medium sizes contain three or four strands.

The twisting is accomplished by taking the wet strings from the stripping process, attaching one end to a clamp and the other end to a revolving spindle. During the twisting and drying process the evenness is produced by gently smoothing and polishing with pumice-stone. In the making of violin strings the polishing, twisting and finishing is carried on to excess, and much of material as sent to the market for surgical catgut is really rejected violin strings.

The entire intestine consists of practically four coats—the serous coat, the muscular coat, the submucous coat and the mucous membrane.

The serous coat, or peritoneal layer, is brittle and worthless for use in the string; the muscular coat consists of two, longitudinal and circular; the submucous coat is more or less firm and strong in tissue; the mucous layer, or villi, is a spongy mass of glandular and epithelial cells.

### Elements that Determine Strength

The tensile strength of the string, therefore, depends upon the muscular and submucous layers. In the production of the lower grades of strings the tendency is to leave the mucous layers, or a large portion of same, as this makes the size but not the strength. On the other hand, the scraping and bleaching has a tendency to lower the tensile strength. The tensile strength is also influenced by several other factors.

Sheep born in the spring and slaughtered in the early fall produce a stronger string. Decomposition of the gut between the time of slaughter and the process of manipulation produces a weaker string.

The possibility of infection and contamination in handling such a portion of fresh animal tissue is very great. To this contamination of handling must be added the danger of infectious material already existing in the sheep, such as anthrax and other bacilli with their spores and the numerous organisms that are found in tissue from such a source.

Our experiments have demonstrated that the mucous coating abounds in organism ferments and other products of organic life, and the spongy nature of the coating constitutes a lodging place suited to hold infection.

It is evident that for the surgical reasons alone this coating must be removed to produce an acceptable catgut. The submucous and the muscular layers are the strongest and the most flexible tissue.

### The Chemistry of Catgut

From a chemical point of view, catgut is a most complex albuminoid substance. It is an organized collagen or gelatin accompanied by a small amount of fats, resins, waxes and salts.

The chemical analysis of catgut throws some light upon its behavior under the action of sterilizing agents and when subjected to the action of tissue fluids.

The greater proportion of the catgut consists of collagen. Collagen itself is insoluble in almost all of the common reagents. It is insoluble in alcohol, ether.

chloroform, xylol, turpentine, oils or glycerin. It is readily changed into gelatin upon boiling with water and especially so in the presence of acids or alkalies.

Tannic acid and mercuric chlorid act upon collagen so that it is unconvertible into gelatin. Chromic acid, formaldehyd and alum produce a tanning effect, rendering the substances more or less unconvertible. These substances, as well as potassium permanganate, carbolic acid, and indeed all acids, in some degree act upon collagen, lessening its flexibility and rendering the substance brittle and weak.

Alcohol abstracts the water from catgut and produces a contraction of the cells (coagulating the albumen), in this action a slight hardening being produced.

We can readily comprehend that watery fluids or steam are not suitable agents for the sterilization of catgut. In the application of dry heat collagen is unchanged provided the catgut is absolutely free from moisture, but a fractional percentage of moisture is sufficient to act upon the collagen, and the tissues are cooked and rendered brittle.

Alcohol, chloroform, glycerin and oils are suitable storage-media, having little or no action upon collagen, provided no moisture is present.

### Effect of Water on Catgut

By the long-continued action of water (or moisture) collagen is slowly converted into gelatin, and as catgut is hygroscopic, if stored in an atmosphere where moisture is present, there will be deterioration in proportion to the amount of moisture and the time of exposure.

Acid fluids act upon collagen very rapidly so that in a slightly acid watery solution a portion of the collagen is at once changed.

The agents used in hardening catgut, such as chromic acid, alum, tannic acid, formaldehyd, etc., harden collagen so that it is changed slowly and absorption retarded.

The proteids, other than collagen, present in catgut have an influence upon the tensile strength and upon the absorbability of catgut. The proteids are acted upon by water, by the salts of mercury, tannic, chromic and other acids. The action of these agents is one of coagulation by which they are rendered more or less insoluble and are hardened. The proteids in catgut are easily changed in the process of sterilization where heat is employed and where moisture is present.

The proteids are also accompanied by their own ferment bodies which in the presence of warmth and moisture convert them into peptone. The salts present in catgut exert little or no influence upon the tensile strength except that the age of the sheep and its condition when slaughtered influence the amount of salts as well as the amount of matrix tissue.

### The Absorption of Catgut

When catgut is embedded in the tissues by the surgeon it is subjected to a stream of moist fluid containing salts, etc. It first absorbs the moisture and swells, the proteid constituents being first to react.

The albumin and globulin bodies are dissolved and all of the proteids are acted upon by their own ferments and further by the ferment of the serum in which they are bathed.

Laboratory experiments indicate that the proteids of the catgut are changed, dissolved in part and possibly absorbed within from twenty-four to forty-eight hours.

The moist fluids in which the catgut is embedded in the tissue are favorable to the conversion of collagen into gelatin, and this in turn is dissolved by intracellular (phagocytic) digestion. The

presence of chromic acid, tannic acid and other substances which have acted upon the catgut hinder the absorption of moisture and prevent the dissolution and change of the proteids and collagen to the degree that they may have reacted upon the catgut tissue.

Again, the presence of mercuric salts, iodine and other antiseptic salts hinder the absorption of catgut in a greater or less degree. This is by reason of their reaction upon the gut tissue and their influence in checking reaction of the tissue fluids surrounding the gut. In other words, they can to a degree check hydrolysis and digestion.

A knowledge of the chemistry of catgut tissues gives us some insight into the difficulties encountered in its sterilization and preparation for surgical uses.

And only with an accurate knowledge of the chemical constituents of catgut can the sterilizing agents be applied with safety or intelligence.

The study of the chemistry of catgut also gives us an insight into ultimate absorption within the tissues.

*(The next paper in this series will describe the preparation and sterilization of catgut.)*

---

## Making Water One Hundred Per Cent. Pure

In the preparation of surgical dressings from cotton fibre, it is of great importance that the water used should be free from chemical and organic matter.

This requirement will be apparent when it is considered that each fibre of absorbent cotton is a capillary, porous cell of absorbent cellulose, and that each individual cell constitutes a filter.

When impure water is passed through a considerable depth of fibre, the water, to a degree, becomes purer, and the cotton, absorbing the impurities, becomes unfit for use.

Water settling, or sedimentation basin. Raw, or impure, water as it flows into this basin, becomes mixed with the coagulents, a gelatinous flocculent precipitant, which settles out carrying with it particles of dirt, etc. The action may be likened to the clarification of coffee with an egg. The process requires several hours.

Very hard water is objectionable for

View of a portion of the water filter basin. The water, after precipitation with the coagulent, flows on to the filter bed, thence through layers of sand three or four feet deep. In this process each sand grain becomes coated with a gelatinous coagulent and assists in collecting dirt and bacteria.

use in the preparation of high-grade absorbent cotton, not only on account of the reaction of the chemical used, but from the fact that the fibres, being absorbent, hold so much of the water that, on drying, a portion of the lime salts remain.

Johnson & Johnson have solved the water problem by installing a complete plant for the storage, filtration and purification of water at their laboratories at New Brunswick, N. J. It is of the most modern construction, the principle involved being sedimentation after treatment with coagulents.

Routine tests are made for turbidity, temporary hardness, color and freedom from coagulents. Periodical bacteriological examinations are made including the fermentation and lactose litmus tests. The laboratory tests show, almost uniformly, a water 100 per cent. perfect.

## Redintol in Bandaging

Redintol has been suggested as a useful substance for impregnating bandages for wound dressing. The bandages are dipped into melted Redintol and applied directly to the wound as a waterproof dressing. Another method is to paint the surface of the finished dressing in situ with melted Redintol.

The bandage is stiffened so as to form a support, which in some cases may take the place of a splint, or even a cast. It is weaker and somewhat more pliable, but very much lighter. It may also serve the purpose of fixing a bandage so that it does not slide on itself, and of protecting the surface of the bandage against moisture and dirt. The bandage is prepared very simply by painting the outer layers of the ordinary bandage with melted Redintol. The bandages can be easily removed by cutting them with scissors.

Redintol may also take the place of adhesive plaster, etc., for sealing the end of a bandage. It may be used to paint the end of a bandage where it is specially liable to become frayed or soiled, as at the wrist. A strip of melted Redintol may also be painted along the side of a bandage to keep the laps from sliding on each other.

# Medical Journals Endorse First Aid Manual

Medical journals in all parts of the country have enthusiastically endorsed the eighth revision of Johnson's Standard First Aid Manual. Short extracts from some of their reviews follow:

### Practically Indispensable

Whatever other works you may have on first aid, you need Johnson's Standard First Aid Manual. It is practically indispensable wherever injuries occur; being both scientific and in plain language it is suitable for physicians, surgeons, nurses and the laity who may be called upon to render first aid."—*Southern California Practitioner.*

### A Valuable Work

"The volume is certainly a valuable work for High Schools, Training Schools for Nurses, and for use as a text book. We heartily commend it to all wishing to acquaint themselves with relief measures."—*Medical Insurance.*

### The Last Word on First Aid

"The Manual in this revision represents the last word on first aid treatment; with the arrangement of methods and technical details it contains definite, practical first aid measures."—*Western Medical Review.*

### Will Save Physicians' Time

"It will be of value to physicians who have this work to do and will save them many an hour of labor. It will be of incalculable benefit to nurses who have not had the training to enable them to ferret out their wants from the comprehensive volumes."—*Medical Sentinel.*

### Concise and Simple

"It combines conciseness and simplicity in such a way that a High School scholar could apply its methods, and at the same time it furnishes suggestions which should be helpful to the busy practitioner. If only for the purpose of freshening one's memory on these points it is worth the price."—*Virginia Medical Monthly.*

**This** is the way the Manual looks in its tidy paper cover.

### In a Class by Itself

"We know of no work on the subject that presents its material in more simple, more comprehensive and more serviceable form."—*American Medicine.*

The Manual will be sent postpaid to any address by the publishers, Johnson & Johnson, New Brunswick, N. J., upon receipt of the price—50 cents cloth bound and 25 cents paper bound.

---

## New Booklet on Burn Dressing

Redintol, the paraffin-wax burn dressing, has firmly established itself with an ever-growing number of physicians who have adopted the war-taught method of treating burns. The technique of operators is fully described and illustrated in a sixteen-page booklet published by Johnson & Johnson. A copy of this booklet will be sent to any physician or nurse, on request. Ask for Booklet No. 343.

## Epidemic Masks

Gauze masks were found to be an effective means of preventing the spread of influenza during the recent epidemic. In some communities the wearing of the

The Johnson & Johnson Epidemic Mask, as worn to prevent the spread of influenza.

masks in public places was made compulsory. The Detroit Medical Journal, of December, 1918, quotes Dr. Woods Hutchinson on the subject of masks as follows:

"Dr. Woods Hutchinson, of New York, said that gauze masks and vaccine were about the only successful methods of fighting influenza. He said quarantines and the closing of all public meeting places were 'a relic of barbarism' with no value. 'With everyone wearing masks in San Francisco,' said Dr. Hutchinson, 'the number of influenza cases was reduced from 2,300 to 300 a day within six days, and business went ahead as usual. They vaccinated 81,000 there with almost no deaths among those thus immunized.' The mask also served to control epidemics of whooping cough and chicken-pox in San Francisco, Dr. Hutchinson said, and should prevent epidemics in other diseases, as scarlet fever, where the germs are carried in the nose and throat. Dr. Hutchinson said the influenza epidemic, which many health officers believed came from the battlefronts in Europe, is returning there."

During the recents months Johnson & Johnson have received a great many inquiries for Epidemic Masks and, as a result, have devised one along the lines suggested by the Marine Service and the Rockefeller Institute, but in an improved form. These masks will be very acceptable for the use indicated.

---

## Literature for Physicians

Johnson & Johnson publish considerable literature of interest to the busy physician, some of which is listed below. Physicians and nurses are invited to send for such publications as they desire. There is no charge for this service.

HANDBOOK OF LIGATURES, No. 226.—This forty-eight-page book gives a full description of how ligatures are prepared, illustrates the various methods of packing, describes the sizes, strength, etc.

HYGIENE IN MATERNITY, No. 41.—A forty-eight-page book which many physicians and nurses like to place in the hands of expectant mothers. It represents the work of several eminent physicians and nurses. Will be supplied for distribution among obstetric patients, if desired.

BLISTERING TIME TABLE, No. 54.—A twenty-four-page illustrated booklet containing concise facts about blistering.

CAMPHENOL BOOKLET, No. 328.—An eight-page booklet describing the medical and surgical uses and the germicidal power of Camphenol

CHLORAMINE-T GAUZE FOLDER, No. 392.—A four-page folder, descriptive of a new antiseptic dressing, a product of war experience.

JOHNSON'S FIRST DRESSING FOR INFANTS, No. 397.—Four-page folder, descriptive of this packet.

FIRST AID CATALOG, No. 110.—Twenty-page pamphlet in colors describing the various First Aid Outfits.

## After-War Medical Practice

In the American Journal of Surgery, Dr. Ira S. Wile states that while it is difficult to prophesy the farreaching results of military experience upon civil practice, it is permissible to suggest that among the gains to be noted will be found a more complete articulation of the laboratory and clinical side of medicine, even in smaller communities where state aid may be required.

The establishment of diagnostic clinics, and the alteration of surgical teams into "group medicine" would scarcely be surprising.

The extension of health insurance, workmen's compensation laws, maternity insurance, ambulance zone systems, central dressing stations, and an increase of hospital facilities would in no way arrive unexpectedly.

Hygiene, sanitation, prophylactic inoculation, serum therapy, occupational therapy represent practical fields of effort whose status has been fixed by the costly experiment of war surgery.

It is safe to assert that humanity as a whole has gained by virtue of medical military experience. There will be a greater expression of democracy in medicine and medical practice. The spirit of humanity, for which the war was fought, will be elevated through the greater service stimulated by the loyalty, devotion, enthusiasm and conscientious efforts of the more than 33,000 medical men whose service stars adorn the honor flag of the medical profession.

## The Care of the New-born Infant

The conservation of infant life is one of the chief problems confronting the American people. Recognition of this has emphasized the great need of proper care of the infant at birth. The eyes, the umbilical cord, the mouth, nose and ears, and the skin of the new-born babe all require painstaking attention, or conditions are sure to arise that not only may lead to the most serious consequences but may even jeopardize the baby's life.

As a practical aid to the proper care of the new-born infant the Johnson First Dressing Packet for Infants has met the hearty approval of the medical profession. Simple and compact, each packet contains everything necessary for the proper dressing of the cord, the cleansing and disinfecting of the eyes, mouth, etc., and safeguarding the baby against infection. The practical utility of these First Dressing Packets has appealed to the physician who does obstetrical work, for, better than anyone else, he realizes how much their widespread use means in "starting the baby right." Inexpensive in price and put up in a way that insures their freedom from contamination, one or more of these packets should be recommended by medical men to every expectant mother as an essential detail of her equipment. They are obtainable of all druggists or physicians' supply houses.—*The Trained Nurse.*

## A Censorship of Prescriptions

In France the law permits the pharmacist to decline to dispense medicine under certain conditions. It is proposed to modify the law in such a way that the pharmacist may decline to dispense a medicine—even if the prescription has been ratified by the physician—when he believes there is incompatibility between the ingredients, or the amounts specified are excessive.

It is also proposed to embrace in the regulations the requirement that every prescription shall state explicitly the single dose, and also the number of doses per day.

# Headache and Neuralgia

are relieved by the rubbing in of

## K-Y ANALGESIC

*"The Greaseless Anodyne"*

Contains no grease to soil the clothing
K-Y
Is easily removed with tepid water
ANALGESIC
the relief of Headache, Neuralgia, Rheumatism, Lumbago,
Sore Throat, and other conditions requiring the use of a

Repeat when necessary, washing off the previous application

"A SAFE, HARMLESS WAY THAT WORKS MOST OF THE TIME"

SAMPLES ON REQUEST

*Non-greasy; water-soluble; effective.* *Collapsible tubes*

*Of all druggists*

---

# "The Cleanest of Lubricants"

## K-Y *Lubricating Jelly*

"The Perfect Surgical Lubricant"

Absolutely sterile, antiseptic yet non-irritating to the most sensitive tissues, water-soluble, non-greasy and non-corrosive to instruments, "K-Y" does not stain the clothing or dressings.

Invaluable for lubricating *catheters, colon* and *rectal tubes, specula, sounds* and whenever aseptic or surgical lubrication is required.

Collapsible tubes. Of all druggists.

SAMPLES ON REQUEST

Johnson & Johnson

VAN HORN & SAWTELL DEPARTMENT

New Brunswick, N. J., U. S. A.

# The Bandage Supreme

Linton Gauze Bandages are supplied in the following widths: 1, 1½, 2, 2½, 3, 3½ and 4 inches

LINTON GAUZE BANDAGES, packed in sealed cartridge cartons, are made from the finest grade gauze of well spun thread. They are tightly rolled, they are full width and length, as specified on the label.

These bandages can be carried in the grip or pocket, as they are perfectly protected from infection while handled. They are sterilized, and the style of packing keeps them aseptic indefinitely.

## FIT TO APPLY DIRECTLY TO THE WOUND

Linton Gauze Bandages in cylinders are sold by count only—not by weight. All druggists and physicians' supply houses sell them.

JOHNSON & JOHNSON, New Brunswick, N. J., U. S. A.

# RED CROSS NOTES

COPYRIGHT, 1919, BY JOHNSON & JOHNSON

SERIES VII NEW BRUNSWICK, N. J. NUMBER TWELVE

Fred B. Kilmer, Editor

This publication is issued from the laboratories of the publishers with the intent to give, in brief, items of interest and reports of original research along the line of the particular branches of the art in which they labor.

Persons receiving *Red Cross Notes* will confer a favor by notifying the publishers of any inaccuracy in the address on the wrapper and of any change of their address.

## The Importance of a Knowledge of Catgut

The choice of sutures has too often been a matter of expedience, and as a consequence the surgeon in many a case has used catgut concerning which he had a woeful lack of information. The suture material was apt to be considered as "merely a detail," and the busy surgeon felt that he had no time to give to the multiplicity of details that surround his daily work. Some one else had looked after the routine.

But the conscientious surgeon today fully realizes the important and serious relationship existing between surgery and suture material, and he wishes to work with a full knowledge of the character of the materials he is using. He knows that he must keep in touch, by personal inquiry and investigation, with the status of so important a detail as the catgut he uses.

An interesting contribution to this subject is now running in the pages of the Notes under the general heading "Ligatures and Sutures." This series of articles, the third of which appears in this issue, was prepared by the Scientific Department of Johnson & Johnson primarily for the instruction of nurses and students, but it should prove helpful to the surgeon himself.

As to the qualifications of the Scientific Department to handle this broad and complex subject, it need only be said that it has devoted over a quarter of a century to solving catgut problems. It has conducted practical laboratory demonstrations of every known and suggested method of preparing catgut ligatures. It has learned, through years of constant investigation, methods of preparation that assure absolute sterilization and perfect absorption of catgut—methods that have earned for Johnson & Johnson suture material the complete confidence of the profession.

A free discussion of ligatures and sutures, such as this series of articles offers, must be interesting and helpful to the profession. It will clear up questions that often arise as to the physical and chemical properties of this substance called catgut—a substance so delicate, so perishable, and so susceptible to infection, but a substance which science has learned to twist into clean, sterile and strong suture material.

# Medicine of To-Morrow

## Dr. Wile Interprets Its Meaning and Opportunities in the Light of the Transformation Which Has Carried Medical Practice from the Old Order of the Care of the Individual to the More Efficient Methods of Attacking Illness and Accidents Upon a Larger Scale

IRA S. WILE, M.D.

Times and customs change. Medicine forms no exception to the rule, but through change comes progress. The practice of medicine in the twentieth century already evidences numerous alterations in character, and tendencies now noted bid fair to alter still further medical practice.

With the higher standards of education required for entrance into Class A medical colleges, the demand for cultivated, trained physicians is exemplified. To counteract the number of years involved in securing an adequate professional education and experience, some revisions of educational procedure are sought. With two years saved in elementary education, with possibly another one eliminated from secondary schools, and with a six year combined college and professional course, and at least one year mandatory hospital service, it will be possible for the future physician-to-be, entering school at the age of six, to be prepared to take up his life work at the age of 22 years.

The necessity for modifying our methods of professional training is more pronounced in view of the transformation which medical practice is undergoing. The vast competitive scheme of practice is becoming subject to new forms, making for co-operation. The tendencies to national unity in public health work are obvious in the co-operative interaction of the United States Public Health Service, the American Red Cross Society, State Departments of Health, and County and Municipal Health Organizations, which are working more closely along definite plans involving a higher degree of harmonious effort. Similarly, numerous national societies are spreading their programs upon the minutes of state and national health organizations. They are seeking to impress the profession in general with the urgency of their demands, while calling upon the laity for assistance in every direction to aid humanity to escape the perils and evils which they seek to combat.

### THE GROWTH OF THE COMMUNITY IDEA.

It is natural that out of a world cataclysm there should grow a higher respect for man. It is unthinkable that after the antisocial devastations and ravages of war, the sense of brotherhood should be dulled and callous. Society perceives the error of its way, and now seeks to re-establish medical practice upon broad social lines. The spirit of the community, the spirit of the state, the spirit of the Nation are invoked in judgment upon measures seeking to conserve men, women and children, the makers of the future.

One may point out lines along which evolution is most marked, although the beginnings were evident before there was familiarity with such names as Joffre, Haig, Hindenburg and Pershing. There has been a growth in the community idea, which involves an extension of all facilities for the protection and care of the diseased and disabled citizens, who are penalized and might in turn punish the public. There will

be a continued growth of community hospitals and dispensaries, with the extension of highly specialized hospitals in the utilization of which many communities will co-operate. As state hospitals for the insane have grown in number, so it is not unlikely to find state institutions for the care of orthopedic defects and the rehabilitation of those injured in industry. The development of venereal disease clinics, under city, state and federal auspices, is a further evidence of work in this direction.

### Social Health Measures.

Social responsibility, which demands that industry carry its own particular burdens, is sufficient reason for the continued progress in the establishment of first aid stations, hospitals and dispensary services by corporations employing large numbers of workers. The wider interest manifest in industrial welfare from the standpoint of health is patent in the recent establishment of a Division of Industrial Hygiene and Medicine, under the auspices of federal service. Probably no field of medicine will manifest greater alteration during the next decade than preventive medicine as applied to industrial life.

While social insurance of various types is still a moot question, the demand for its adoption is apparently increasing. In addition to employers liability or workmen's compensation acts, there probably will be evolved systems of sickness insurance, old age pensions, maternity insurance, and similar enactments designed to benefit the vitality and comfort of the masses. As social health measures, too, one notes forms of legislation calculated to affect hours of labor, minimum wage standards, and similar indirect health benefits tending to affect all branches of society.

As further indications of the larger co-operative agencies seeking to benefit public health, one need but mention such national organizations as those created for the control of tuberculosis, cancer, venereal diseases, the prevention of blindness, rural sanitation, industrial hygiene, and mental hygiene. To these may be added such definite trends in governmental machinery as are marked in the efforts to control infant mortality by the establishment of maternity clinics and babies' welfare stations. Medical inspection of schools, school nursing, social workers in connection with dispensaries, and the increased stress placed upon the regulation of alcohol, drugs, and the improvement of food and water supplies, along with general sanitary improvement are signposts of present and future practice.

### The Day of Preventive Medicine.

Such endeavors as have been enumerated are prophetic. They do not clearly point out their goal, because, as progress is made, the goal is always on the horizon, and, apparently, ever as distant as before. What is patent, however, is that the medical profession is already undergoing profound alterations. The medical practitioners of to-morrow will not have the same problems to deal with as those practicing to-day. One need but recall the gradual decrease in various types of diseases which in former generations served to constitute the bulk of medical practice. The severe cases of Potts disease are rare. The widespread devastations of syphilis in its most revolting types are scarcely seen. Typhoid fever, enterocolitis, malaria, dysentery, smallpox, and yellow fever are rapidly following into the category of obsolescent conditions. The youthful graduate of to-day can scarcely grasp the profound changes which have made possible their reduction. The stress placed upon preventive medicine to-day may give an inkling to the new

licentiate of the marked strides which have been taken during the past two decades. A generation ago public health work was largely a matter of sanitation, and the vast health agencies now in operation were scarcely known. The commonest activities for the social regeneration of community vitality employed few physicians twenty years ago, and yet the greatest opportunity of to-day arises in connection with preventive health work.

The era of medical research has been continuous; but like all forms of motion, there is a wave which now has achieved a greater height than in previous years, and the demand for research workers is not equalled by the supply of adequately trained investigators.

A Demand for New Types of Nurses.

The status of public health nursing, similarly, has affected seriously the problems of nursing, and the call for workers in this direction is putting our training schools to the test. The employment of nurses in laboratories as technicians, in hospitals as anesthetists, and in community service as district nurses, home visitors, and educators has materially changed the conditions of nursing practice. Hence, to-day, there is a demand for new types of nurse, one whose training will be more specialized on the one hand, and another whose experience will be principally on the side of practical nursing fitting her for caring for the numerous illnesses for which highly technical training is not an essential.

The Importance of Social Pathology.

Throughout the world is apparent an unrest. The bulwarks of government have been partially undermined and threatened by varying degrees of ignorance, poverty and disease. The cry for health emanates from many lands. The great opportunity of libertarians lies in succoring humanity. Disease is no longer regarded as merely a matter of infection. Social pathology is as important as microbic invasion. In the efforts to overcome ignorance and poverty, and their various natural consequences, the demand for sympathetic and understanding physicians is increased. Public health medicine has assumed a position of maximum importance. The prevention of disease is recognized as a fundamental step in the promotion of national contentment.

The old order of competitive medical practice for the cure of individuals afflicted is slowly giving ground to the more effective means of co-operative methods of attacking illness and accidents upon a larger scale. Therapeutics is interpreted as a means of securing prophylaxis. Prevention of human affliction assumes magnificent proportions. There may be fears of paternalism or objection to the arrogation of medical functions on the part of governmental authorities, but it is patent that the larger vision of greatest usefulness will determine the course finally to be pursued. The needs and rights of the mass will take precedence over the interests or desires of any class in the community.

With health raised in popular esteem, and recognized as the first wealth, it is readily appreciated that the conservation of vital resources is to assume a place in the world, second to none. The growth of the public health movement will be rapid, and the significant changes now evident will be revealed in greater and richer content than is at present discernible.

These newer blossomings in the field of medicine will not enure to the disadvantage of professional men. With greater advantages to society as a whole, there will be a larger measure of opportunities for those called physicians.

# Cripples: In War and Peace

## In One Year in this Country Accidents Alone Disabled Over Eight Times as Many as the Total Number of Our Casualties in Europe, But War Has Taught Us How to Rehabilitate Them

If the war has taught us nothing else, it has taught us that the maimed individual need not be set down as a total loss to society. During the course of the war, when man power was such a precious thing, the resources of the Allied specialists were taxed to an extreme to invent methods whereby the injured could be restored to social usefulness; and the achievements of the surgeons and physicians in this respect are a monument to their ability. Men with amputated arms were equipped to do the most skillful manual work; men with their limbs amputated were able to move about as freely as the normal individual; men blinded by gas or injuries were trained to an amazing degree of dexterity. They were restored to society as self-supporting, self-respecting individuals.

*© International Film Service.*

Soldiers who have lost their right hands are trained to use artificial hands, even to write with.

Realizing the wonderful work that was done with war cripples, it was only natural that attention should be turned to the peace cripples, men enrolled in the vast industrial army who have been maimed in the pursuit of their work. In the past it has been the custom to grant such an individual a small award and dismiss him from further thought, thus thrusting him upon the public as an object of charity and pity. It was his fate to pass the rest of his days as a burden both to himself and to his neighbors—a permanent outcast on the scrap heap of humanity. There are in this country to-day tens of thousands of industrial cripples who are the victims of an unenlightened system of neglect which must now go the way of all wasteful, superannuated systems; for the lesson of the war points the way to making them once more productive, contributing citizens of the community.

The rehabilitation of the soldier is obviously our first duty. But just as clearly our next duty is the rehabilitation of the maimed members of the army of American workers. During the war about ten million men lost their lives. Throughout the world there is a dearth of men, and this at a time when men are needed more than ever. The wastage and destruction incident to the war has been enormous. Every individual capable of working is required, in order to make good the havoc that has been wrought. Labor is at a premium, and the need of rehabilitating the industrial cripple is more imperative than ever. Such a course recommends itself

therefore, not only on sentimental grounds, but on the most rational and practical grounds as well.

AN APPALLING RECORD OF ACCIDENTS.

Data furnished by the United States Bureau of Labor Statistics show that in one year in this country accidents alone disabled over eight times as many as

© *Underwood & Underwood.*

**This is a device for strengthening the weakened wrist. When the hand, which is strapped to a dial arrangement, is moved from side to side a two-pound weight, connected with the dial, is lifted and lowered in proportion with the circumference covered by the movement of the hand.**

the total number of our casualties in Europe. These figures do not include those incapacitated by industrial disease. Such a record is appalling and it is small wonder that the movement to enact legislation in favor of the industrially disabled has met with such universal approval, particularly among physicians, employers, and laborers themselves. It is safe to predict that a new era is approaching, an era in which the maimed workingman will assume a place beside the maimed soldier as one toward whom the public had a solemn obligation to fulfill—and has proudly fulfilled it.

There is a bright side to the neglect which the crippled laborer has suffered: he will be able to benefit by the wonderful progress that has been made during the war and by the ingenious methods and inventions that have been evolved. The process of rehabilitating the industrial cripple will follow practically the same lines as the rehabilitation of the war cripple; and those disabled by disease will in many respects be subject to the treatment applied to soldiers rendered unfit by disease during service. The methods employed in the war hospitals to reclaim incapacitated men are becoming well known to the public, and these methods, perfected by experience, will be carried out in the industrial hospitals that are destined to take their place.

SHOULD TEACH SELF-CONFIDENCE.

In one respect, however, the rehabilitation of the wounded has been imperfect, and not as well developed as it might have been—a consideration that is of even greater importance with the industrial cripple than the war cripple—and that is, in respect to the education of the spirit of the injured individual. The cripple faces life under a severe handicap, particularly in a social sense. His status has always been that of an inferior and he has resigned himself to acceptance of that status.

Such an admission of inferiority, encouraged by the thoughtless and often callous attitude of his sounder fellows, is destructive at once of efficiency and self-respect; and, the work of rehabilitation should begin with a firm and insistent effort to convince the injured man that he can get on a par with his fellows, and can confidently face them as an equal. He must not be permitted to feel that he begins with the shadow of defeat hanging over him, that there is any humiliation in his infirmity. He

© *Underwood & Underwood.*

This photograph shows a device for strengthening the wrist and fingers. The first man to the right is operating a dial arrangement controlled by a knob. As the knob is turned the rotations made by the hand are recorded on the dial. This eliminates any possibility of fooling the doctor. The second man is operating a wheel arrangement as a finger strengthener. The third and fourth men are undergoing finger treatment by means of weight attachments. As the fingers are raised and lowered, weights, which are connected through pulley arrangements to the gloves they are wearing, are moved proportionally.

must be encouraged to feel that there is no stigma upon him, that he is as good as the next man, and that he resumes the pursuit of his purpose with everything in his favor. Once his confidence in himself is restored, the steps that follow will be simpler and easier.

THE IMPORTANCE OF PHYSICAL EXERCISE.

Little emphasis in the past has been laid upon the importance of one item of progress which has developed in the course of studies in rehabilitation: that of physical exercise. Hitherto, so long as a patient was a bed case, he was given the minutest attention; but once he left his bed his further progress was left chiefly to the slow methods of nature.

It has been the experience of experts that physical exercise, prescribed for the patient in keeping with the nature of his ailment, has proved a splendid ally of nature and has expedited complete convalescence. Furthermore, it has kept many patients from committing errors which undid all the good work that the doctors had achieved. Regarding the importance of physical exercise and carelessness during convalescence, Walter D. Powell, athletic director of the Sixth Naval District, Charleston, S. C., writes in "The Modern Hospital" for May:

"In both the army and navy it has been customary to give a patient who is recovering a sick leave of thirty or sixty days, the idea being that the rest, change of scenery, and the possible visit home may have a valuable psychological as well as physical effect on his condition in general. In some cases this plan works out well, but too often men in the service who are granted furloughs rush away on the first train to their homes, eat anything and everything at irregular hours, sleep in crowded, improperly ventilated cars, and take cold. As a result many of them relapse into a condition worse than the first."

An authority on the value of physical exercise for convalescent soldiers, Mr. Powell, as the result of his experience, recommends that a qualified physical expert should be added to the staff of every hospital. Without encroaching on the duties of the other heads of the hospital, he will supplement their work,

beginning at the point where their chief work has been done and dealing only with convalescents. His duty would be to take charge of all patients as soon as they are able to leave their wards and prescribe certain exercises in accordance with the need and ability of each individual case.

© *Underwood & Underwood.*

This is a device used for treating flat feet and stiff legs.

In some cases only the simplest and least trying movements would be wise, but in many cases more vigorous exercise would be beneficial. As the men grow stronger, easy games such as cricket, quoits and volley ball may be recommended. Later, with the approach of a normal condition, basketball, handball, boxing and wrestling may be added. Throughout, the patient's circulation and weight should be carefully observed. "Above all," Mr. Powell concludes, "the physical director should see to it that the men have enough recreation so that they will have no time to brood. If they are contented the battle is half won. Keep them in the open air and sunlight as much as possible, and, most of all, teach them how to breathe pure air properly."

The program pursued at General Hospital No. 9, at Lakewood, N. J., will perhaps serve as an excellent model for the hospitals for industrial patients which are sure to be a development of the near future. Here, too, exercise is regarded as of the utmost importance and is made compulsory for all as soon as they leave their beds. When the patient is able to get about, he is care-

© *Underwood & Underwood.*

This photograph shows one of the devices for exercising the ankle and lower calf. The foot, which is attached to a dial, lifts a pound weight fastened to the upright board, when moved along this base.

© *International Film Service.*

Wounded soldiers are being taught a trade in this machine shop, established in connection with a reconstruction hospital.

fully examined by a physician and is given a card indicating the type of exercise that he must take. He is then assigned to a class and must report every morning.

### The Educational Hospital.

But it is the educational hospital chiefly which points the way to the future. In industrial accidents, the injured man often is unable to resume the work at which he has spent many years and in which he has become highly trained. In such an event, it becomes necessary to help him to the choice of some other vocation, and the educational plan pursued at this hospital makes it possible for him to choose for himself rather than have his new work thrust upon him. A corps of experts and specialists co-operate toward this end.

The man is given great freedom in his choice, his strength and his inclination being the determining factors, little being left to chance. He is first consulted as to his preference and he is permitted to do the work he wants to do, provided it will not injure him. He remains at this work for a certain period. Sometimes it proves too trying or the patient finds he has made an uninteresting choice; in which case he is permitted to make a change, his advisors recommending the type of work they think might be suitable without making him feel that he is obligated to choose as they dictate. Ultimately, the patient finds the work he likes best and at which he can accomplish the most.

It is only in rare cases that the authorities are obliged to dictate activities contrary to the wish of the patient, and this is done only with the patient's good in mind. At this hospital one of the men was suffering from an injury to the arm which left the fingers of his right hand paralyzed. He was firmly convinced that he could never use this hand. He was sent into the mechanical department and put at work requiring the constant use of the affected hand, and in time he found that he was able to regain the full use of the injured member.

In an industrial hospital, an educational department would prove especially valuable in that it would often help to convert a man's injury into a disguised blessing. The reason for the low productivity of many workers is the fact that they have been often compelled by

circumstances outside of their control to choose a type of work in which they are not interested and at which they cannot do their best. Often a laborer feels that if he only had had the means and the opportunity for a better education he would occupy a higher place in the world. To such the educational department can offer the opportunity to remake their lives; and if the community pays the expense it will benefit by the increased service that the individual will render. This department, as in the case of the Lakewood Hospital, can offer modern industrial, mechanical or business courses to those who desire them; or it can offer advanced educational work to those whose bent is in that direction.

There is a well directed movement afoot for the introduction of a system of industrial hospitals for the reclamation of maimed workers which will follow the lines of the war hospitals and employ the valuable experience acquired there. Conscientious physicians all over the country are heartily in favor of such a step, and it is to be hoped that it will meet with the prompt success it deserves.

## Modern Treatment of Burns

William Senger, M.D., of Pueblo, Colorado, in the "American Journal of Surgery," states that no class of wounds has been treated in so many different ways as burns.

Since 500 B. C. warm sterilized waxes have been used. Our grandmothers treated burns with a mixture of waxes, tallow and balm of Gilead buds—through our supercilious attitude towards home remedies this method was relegated. The wax method was replaced by varnish, paint, carron oil, adhesive plaster, wet dressings and powders, which had as the underlying principle the exclusion of air. In recent years the open air treatment had many advocates; through this treatment we realized that friction of the nerve endings, rather than air, was the cause of pain.

Out of the war came the paraffin wax treatment. Burns treated under this method healed with extraordinary rapidity. We do not know why this treatment, contrary to modern surgical principles, produced such results. In this treatment we lock up foul secretions containing bacteria and the patient recovers in half the usual time.

Can it be that the continual protection and the immobilization of the tender new epithelium and granulations in the presence of moisture give them an opportunity to grow so rapidly that they ignore the presence of bacteria and rapidly overcome them by mass attacks?

The author concludes that the paraffin treatment of burns has the following advantages:

1—Immobilizes the wound.
2—Protects granulations.
3—Stimulates epithelium growth.
4—Greatly minimizes pain.
5—Renders subsequent dressing easy and healing much more rapid.
6—Prevents excessive scar formation.

In his judgment, third degree burns, unless very small, should not be treated by the paraffin method, but rather that the part should be rendered aseptic and the skin graft used to avoid scars.

---

In the course of a year over eight million people receive hospital treatment in this country, at a cost of nearly eight hundred million dollars.

# Ligatures and Sutures

## PAPER III

*(Contribution from the Scientific Department of Johnson & Johnson)*

This is the third installment of a series of papers upon the nature and properties of the various materials which are used in surgery for ligating and suturing. They have been prepared in response to numerous requests, and in the form presented will undoubtedly be found of service to students, nurses and others who have to do with this class of material.

### The Preparation of Catgut.

Johnson & Johnson have entirely reversed the slaughter house methods of preparing catgut. Under the methods of animal inspection now in vogue in this country we have little difficulty in procuring tissues from healthy animals, or at least those which are not infected with tetanus, anthrax, or other organisms or grave lesions. We are also succeeding in securing materials from animals which as a rule give a desirable product. We find that in the older animals the tissues are thicker, larger and darker in color. There are other variations which are apparently dependent upon the breed of animal, the method by which it has been fed and handled, and still other factors—the nature of which are not altogether determined—which affect the color, strength and pliability of the tissues.

### The Initial Cleaning.

In our process the intestines, immediately upon removal from the animal, are placed in troughs of stone or slate and flushed with hot and cold water. Here the greater portion of the intestinal contents, blood and foreign matter, are washed away. The large intestines—the stomach, etc.—are separated from the smaller ones. The small intestines, which we use, are then placed in a trough or vat containing a disinfectant, and at this point begins the true work of cleansing and disinfection. For days, at times for a week or more, the intestines are continually washed in disinfecting and cleansing solutions.

This illustration shows the tube of intestine tissue split open at one end and twisted at the other end to make a cord of catgut. The black bar has been inserted in the tube in order to show the tubular character of the tissue.

In this room the gut is twisted into cords, after it has been thoroughly cleansed, split and scraped. The room is enamelled throughout and the table in the foreground is made of heavy glass.

The process, in brief, consists of passing the intestinal tubes from one vat to another. The material is continuously flushed, squeezed through rollers and washed, and they emerge from the process in the shape of strings about sixty feet in length.

### Splitting and Scraping the Gut.

During these processes the material is passed through a series of rollers, the object of which is to loosen and scrape away the spongy villi layers. Further manipulation consists in the splitting of the gut.

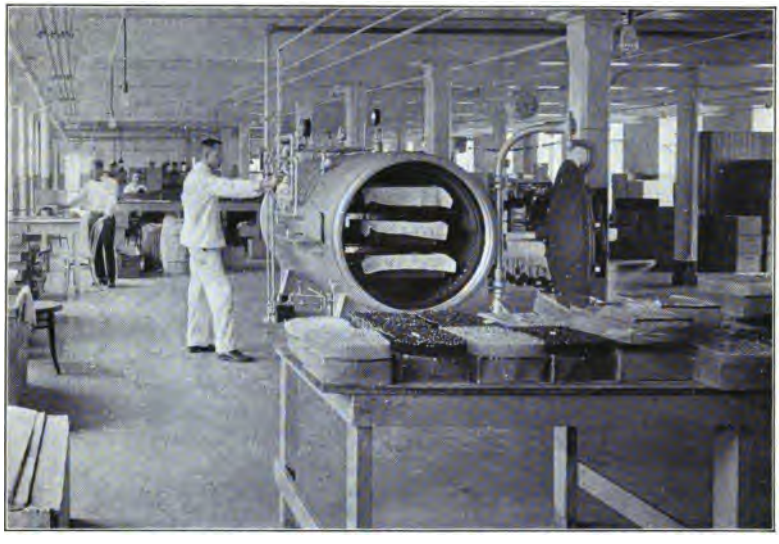
Take a piece of rubber tubing, and, with a knife or shears, split it so that it is in two halves; this will give an accurate representation of the process, except that it is done by special machinery, whereby the material is stretched, as for example, over a rod, and an upright knife does the splitting. The material passes from the solution to the machine and is delivered into another solution at the completion of the process.

The scraping process follows the splitting process upon the split gut, as it precedes it upon the whole gut. It consists in drawing the gut repeatedly against dull edges by the means of rollers. This weakens and removes the mucous layers, in a measure scrapes them off, and has a tendency to make the material pliable, transparent, smooth, and of equal thickness. Upon the thoroughness of this process depends the texture and strength of the finished strand, and it necessarily includes repeated washings, flushing and final removal of all chemicals.

At the completion of this process the gut is placed in jars containing an antiseptic solution and sent to the twisting laboratory.

### Twisting and Drying.

The next stage is that of twisting. The smaller size guts are made by simply twisting one strand of the tissue



After the tubes are sealed they are sent to this room for their final sterilization. One of the high pressure steam sterilizers is shown in the foreground.

material, the larger sizes by two-ply, three-ply, etc., but the sizes further depend upon the thickness of the tissue. Hence, the sizing at the time of twisting is only approximate, and the strands are carefully re-sized. The process of twisting, or torsion, is self-explanatory. To simply twist any loose cord illustrates the process. Twisting can be performed with the fingers, or with an apparatus, one end being held while the other end is rotated.

After the twisting a peg is slipped through a loop at each end and the cord is stretched out and dried. During this drying it is rubbed down, smoothed and polished.

The above processes may be summarized by stating that they consist essentially of a continuous disinfecting and washing of the loose untwisted string. In such process the introduction of putrefactive material, which obtains in the usual slaughter house processes, is prevented, or, if present, is removed. An important point is to prevent decay. In the usual method of manufacturing these strings they are allowed to ferment for four or five days in order that the splitting and scraping may be more easily performed.

The catgut is next gauged for size and tested for tensile strength. It is then packed in containers, such as tubes or envelopes or made into coils for the so-called raw gut. If it is to be impregnated with antiseptics, or chromicized, this is done before the twisting.

### Sterilization Process.

The methods of sterilization and of handling ligature material in the Johnson & Johnson Laboratory are of a character which places them in the class of highly scientific, thoroughly approved bacteriological procedures. The Research Laboratory is in constant daily touch with the manufacturing work in the Ligature Department, and the processes used are not only constantly un-

der the eyes of the scientific men of this laboratory, but the resulting ligatures themselves are tested and controlled by them. Moreover each lot of ligatures is held for test and is not released for sale until passed and approved by the Research Laboratory.

In discussing sterilization processes it must be remembered that different treatment is necessary for the different varieties of ligature material, and that no general process covers them all. However, certain prominent features are present in all processes, and the chief one that interests the surgeon is the general classification under the heading, "Heat Process."

In no case is it allowable for ligatures to be handled in a manufacturing establishment, even of the highest class, after sterilization has taken place; that is to say such handling necessarily must not be depended upon to keep the ligature sterile, but final sterilization must be carried out after the container is hermetically sealed. Johnson & Johnson have made a very close study of the sterilization of catgut for many years.

### The Value of Initial Control.

In our work we use the intestinal tissue of selected sheep. We clean and disinfect it thoroughly before the tissue is twisted to form the cord called catgut. We begin at the very beginning and consequently we are assured that we deal only with clean, sanitary material. At this stage of the process, therefore, our treatment of catgut is well advanced, whereas many other manufacturers begin with the twisted strand of dirty commercial catgut.

### The Preserving Medium.

Catgut is put up chiefly in tubes, and unless there is a needle with the catgut in the tube, chloroform is used as a preserving medium, for the reason that it is necessary, if the tubes are to be boilable, to have in the tubes a liquid that is free from water. Chloroform also is very strongly germicidal, especially when heated. With catgut preliminary sterilization in hot oil is carried out and after this treatment the catgut is put in tubes, covered with chloroform and the tubes flame-sealed. Then they are subjected to sterilization by steam under pressure.

When preparing most other ligature material, such as silk, alcohol is used as a preserving medium, and the sterilization here is also carried out after the tubes are flame-sealed, using steam under pressure for the purpose. All of the methods used are such that they are well understood by bacteriologists in general, and a survey of our ligature work is always sufficient to convince any competent observer that our methods are absolutely scientific and are trustworthy in every way.

### A System of Continual Sterilization.

As a summary, the Johnson & Johnson method for the sterilization of catgut, is a continuous series of processes, a system not dependent upon any isolated act.

1.—The immediate disinfection and cleansing of the raw intestines directly after they leave the sheep; the removal of the various coats of the intestines, leaving the submucous coat.

2.—Disinfection (and chromicizing) of each gut before twisting to make the strand.

3.—Twisting the guts into a strand under aseptic conditions.

4.—Heat sterilization applied in kind, quantity and manner to effectively destroy organisms of every nature; spore bearing or non-spore bearing, pathogenic or non-pathogenic, pyogenic, and all organisms of every kind.

5.—Final sterilization after the tubes or envelopes are sealed.

6.—Bacteriological verification and control.

The method is a system of thorough and continued sterilizations, not dependent upon any one feature, nor upon any miraculous power of any antiseptic, nor upon any one degree of heat, but upon the combination of the whole, and every process, every step is rigorously controlled by bacteriological test.

(*The next paper in this series will describe hardened, or chromic, catgut.*)

---

## Medical Profession Welcomes First Aid Manual

The eighth revision of Johnson's Standard First Aid Manual has met with a cordial reception at the hands of the medical profession. The following are extracts from some of the letters received:

COMPLETE AND COMPACT.

"Johnson's Standard First Aid Manual seems very complete and compact, and I am sure will meet with a hearty reception."—William M. Harsha, M.D., Surgeon of Rock Island Railway.

SAVES TIME.

"Johnson's First Aid Manual covers in a small amount of time that which a large number of text books fail to get at all."—Drs. Alvis and Alvis, Surgeons C. & E. I. I. C. and M. P. Railways, Benton, Ill.

VALUABLE.

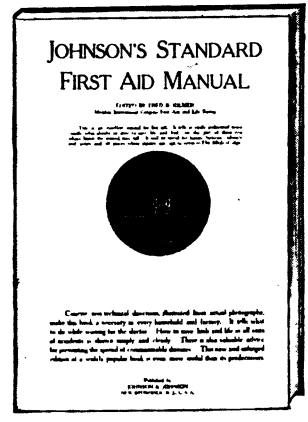
"I consider Johnson's First Aid Manual a valuable addition to my library."—Dr. W. F. Cobb, Lyle, Minn.

HAS THE SUBJECT DOWN PAT.

"The Manual has proven a very excellent book and has the subject down pat."—Dr. Addison W. Baird, New York City.

PRACTICAL, UNDERSTANDABLE.

"I find the volume eminently practical and understandable and have perused it with profit. I am placing the book in the Nurses' Training School Library."—Dr. C. W. Hargeus, Chief Surgeon, Lutheran Hospital, District Surgeon C. & N. W. Railway.




This is the way the Manual looks in its tidy paper cover.

HELPS FIRST AID TEACHERS.

"I consider Johnson's First Aid Manual the most complete and concise first aid manual I have ever observed and it will be of value to me as I do some first aid teaching for the Grand Trunk Railway System and the Boy Scouts."—Dr. James A. Rowley, Durand, Mich.

A GREAT BENEFIT.

"I think you are to be congratulated upon Johnson's Standard First Aid Manual. It will be a great benefit to any physician engaged in first aid work or as a text book for industrial systems or schools desiring to teach first aid. It is very complete and well arranged."—Ezra T. Goble, M.D.

# Red Cross Notes

## Surgical Lubrication

For a long time the custom of lubricating instruments of penetration, i.e., sounds, catheters, specula, etc., has been practiced not only as a means of facilitating their introduction, but also of avoiding pain, decreasing the tendency to spasm, and preventing abrasion of the membrane. But it is only within recent years that the importance of placing lubrication on a surgical basis has been understood: in other words, that the faculty of being merely slippery or "greasy" was not enough. Actual greasiness, however, was recognized as a most objectionable feature, since it made the lubricant uncleanly, increased the difficulties of removal and seriously interfered with local treatment. This and the constant danger of infection were doubtless largely responsible for the dissatisfaction which at last brought about a change in the character of lubricants.

With the evolution of aseptic methods and the recognition of the need of making lubrication conform to surgical standards, the "pot of mutton tallow" and "jar of petrolatum" soon became obsolete. In their place the practitioner now employs lubricants that are not only much more efficient in their physical properties, but free from the features which made those of the past a constant source of danger and trouble.

A lubricant that may be said to have been developed as the direct outcome of the insistent demand that agents used for lubricating purposes measure up to surgical requirements, is K-Y Lubricating Jelly.

This widely used preparation is possessed of a high degree of lubricity, is non-greasy, water-soluble, and not only non-irritating, but notably bland and soothing in its effect on the tissues.

A non-greasy, water-soluble lubricant that can be relied upon whenever aseptic or surgical lubrication is required.

Furthermore, it is colorless and will not soil or stain the skin or clothing. Its water-solubility is a particularly desirable quality since it assures its easy removal, and permits the ready application of local medication. Finally, K-Y Lubricating Jelly is sterile and antiseptic.

From the foregoing it is apparent that the physician has at his command in K-Y Lubricating Jelly, a non-greasy, water-soluble lubricant that he can rely upon whenever aseptic or surgical lubrication is required, with absolute freedom from local irritation or staining or soiling of the skin or clothing.

Moreover, K-Y Lubricating Jelly is so soothing, cooling and emollient in its effect on the skin, that many physicians have found it invaluable in a wide variety of skin affections, especially pruritus, sunburn, prickly heat, chafing, sore hands and feet, and inflammatory conditions in general.

# An Ethical Publicity Campaign

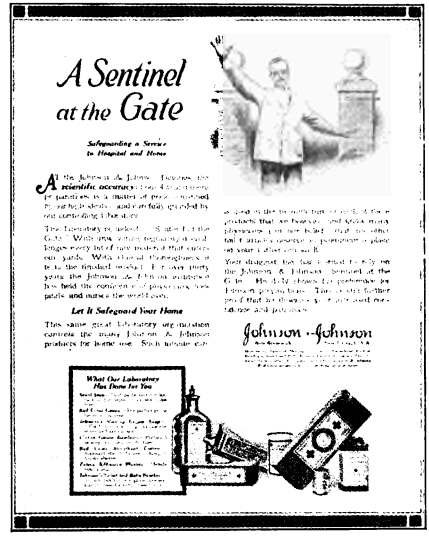
## Johnson & Johnson Are Doing in a Big, Broad Way the Very Thing that the Medical Profession Wants Done

The advertising campaign of Johnson & Johnson in the home magazines of large circulation has prompted considerable favorable comment on the part of the medical profession. The conservative and dignified announcements, emphasizing the scientific care taken in the preparation of Johnson & Johnson products, are educating the people to demand, when they need such preparations for home use, the same high standard of quality that is required in hospital and surgical use.

In educating the people to realize the importance of quality and purity in articles that come in contact with human flesh, in impressing upon them the necessity of avoiding infection by using sterile dressings in home use, this campaign is doing in a big, broad way the very thing that the medical profession wants done.

The service which Johnson & Johnson is rendering to the home, through such products as Red Cross Cotton, Red Cross Gauze, Synol Soap, Baby Powder, Camphenol and Shaving Cream Soap, is the central idea of the advertising. No cure-alls, no remedies, no medicines, no lines of treatment of disease are offered or suggested. In all Johnson & Johnson publicity the policy has been to lay stress upon the necessity of sending for a physician when ill or when accident occurs and upon the urgency of having pure, sterile dressings handy for use until such time as the physician arrives.

Some of the suggestions for our advertising have come from our medical friends. One of them happily referred to the Scientific Department as "the sentinel at the gate," some time ago,


A Sentinel at the Gate
Safeguarding a Service to Hospital and Home
Let It Safeguard Your Home
Johnson & Johnson
What Our Laboratory Has Done for You

**A greatly reduced reproduction of a page advertisement which was inspired by a medical friend. It appeared in Literary Digest and the Saturday Evening Post.**

being impressed with the vigilance exercised by this department in challenging all raw materials which enter the plant and all finished products which leave the place.

"It is this sentinel which has enabled Johnson & Johnson to gain the high position it holds to-day in the estimation of the medical profession, and it is this same sentinel which is safeguarding the interests of the public," he said.

In this apt simile was born the idea for the "Sentinel at the Gate" advertisement, which is here reproduced in miniature. The general public is being told how this sentinel, symbolic of a great laboratory organization, stands ready to protect their homes if they will avail themselves of its service.

Incidentally, in all of the advertising the reader is urged to patronize his druggist for his supplies. The advertising is endeavoring to help pharmacy retain its professionalism, so essential to the full enjoyment of public confidence and yet so frequently overshadowed by the enthusiasm of commercialism.

## Preventive Measures in the Transmission of Influenza

Colonel Charles Lynch and Lieut. Colonel James C. Cumming, of the Medical Corps of the United States Army, in a report as to the role of the hand in the distribution of influenza virus and the secondary invaders, reached the following conclusions:

1. Influenza, as well as the other so-called air-bone or respiratory diseases, is essentially a hand-to-mouth infection.

2. There are major and minor modes of transmission by indirect contact—by the former through tepid mess-kit wash water, and by the latter through intermediate inanimate objects, the hand being the conveyor in both instances.

3. Transmission by direct contact is only subsidiary to the indirect routes.

4. The adoption of a universal method of washing mess-kits in boiling water will enormously reduce the prevalence of all mouth-borne infections.

5. The prevention of the hand-to-mouth infections may be accomplished by any measure which will prevent the unclean hand from visiting the mouth and nose and by the thorough cleansing of the hand after all such visits.

6. The incubation period of influenza would appear to be from two to three days.

It would therefore seem that the rules adopted in the Chicago School of Sanitary Instruction for keeping the hands clean, are applicable in influenza. They are as follows:

Hand washing is necessary—

Immediately before eating.

Immediately before handling foodstuffs, in course of preparation or serving.

Immediately after necessary toilet attentions.

Immediately after handling the sick or articles from a sick room.

Immediately after handling any dirty article.

In washing give special attention to the cleansing of the spaces under the fingernails. Use lots of soap, warm water and a good hard bristle brush.

Keep your hands clean and you will avoid many unnecessary infections.

Synol Soap is one of the most efficient soaps for cleansing the hands. In using Synol the hands are made clean, and the germs of disease, if present, are destroyed at the same time.

## Soap and Water—the Great Antiseptic

One of the lessons of the recent war has been a clearing up of our knowledge in regard to the use of antiseptics in surgery. While the list of failures is long, it is nevertheless true that there are certain well defined successes.

It is stated that during the later campaigns in Belgium, it was necessary to discard some of the more elaborate antiseptic methods, and to get back to some simple procedure. The results showed that cleanliness after all was one of the best antiseptics, and this led to the regular use of soap and water in the British and Allied hospitals.

Capt. J. D. Haycroft, in charge of

one of the Casualty Clearing Stations in France, has stated that "soap solution easily permeates and comes in contact with the whole surface of the wound. It acts as a mechanical cleansing agent, washing away all debris. It follows from this that the tissues themselves are able to deal successfully with any infection which is left behind without the aid of any antiseptic. These latter cases, when treated by soap solution, heal better than if an antiseptic is used."

To these advantages surgeons are able to add others. Healing of wounds goes on without much fever, and in most cases the men are convalescent in ten days. After a day or two the swelling of the flesh begins to subside, redness disappears and healthy skin begins to form. As a rule it is not necessary to put in drainage tubes, for there is little discharge. Germs that ordinarily infest wounds are driven out with the dirt and succumb to the natural influence of cleanliness and fresh air.

This method of treatment is regarded in the light of a health cure, and that explains the agreeable sense of comfort and freshness which it seems to diffuse. In the last few months it has been regularly installed as a cure in the British Hospitals.

To the layman it seems as if such a remedy as soap and water, which means cleanliness, was justified by almost universal experience. It has been neglected, probably with a disadvantageous result, in these days of antiseptics, but it is to be hoped that its merits will be fully understood.

Apart from the question of wounds and personal cleanliness, experience shows that there is little value in the ordinary methods of fumigation and disinfection unless soap and water and energetic use of elbows are first employed. And this remedy is one that everybody can use with safety.

Editor's Note.—Synol Soap, which in itself is a perfect cleansing agent, thus an effective disinfectant, would therefore seem to be indicated as a perfect material for the cleansing and disinfection of wounds.

---


## A Service That Penetrates Even Remote Corners

The "open season" was on in the Adirondacks. Far away from drug store or hospital a well-known broker and a surgeon had been hunting.

That the broker should be accidentally wounded was quite unforeseen. Otherwise the surgeon would have been well supplied with bandages and absorbents. Instead he had only his instruments—pocket instruments at that.

But in the cabin where he carried the wounded man the surgeon found a small blue package. It contained absorbent cotton—Johnson & Johnson's Absorbent Cotton, the kind he used in his own New York hospital.

Pure, absolutely safeguarded by the name of Johnson & Johnson—this cotton gave him surprising confidence. With new hope of success he probed the wound. The operation was safely as well as satisfactorily conducted. The broker's life was saved.

That night the surgeon thanked God for the reliability of Johnson & Johnson products and for the nation-wide Johnson & Johnson service that penetrates remote corners of the earth.

# A Local Analgesic of Exceptional Value

Of the many important medical and surgical developments of the war, says a prominent authority, the one that promises to be of greatest value in general practice is recognition of the special utility of physical methods. This is by no means limited to mechanical procedures and appliances, but extends to manual manipulations and the use of various local applications.

In no direction has this trend of medical practice proven more useful and effective than for the control of pain. Experience has demonstrated that many painful conditions for the relief of which opium or some of its derivatives were considered indispensable, can be as promptly and completely overcome by certain local measures, and without any of the drawbacks of the usual internal anodynes such as suppression of the secretions, constipation, depression of the heart, habit formation, etc., etc.

A local remedy that has been shown to be exceedingly effective in relieving the pain of rheumatism, headache, neuralgia, lumbago, myalgia, etc., making it possible in a great many instances to dispense entirely with the use of internal anodynes, is K-Y Analgesic. This is a well balanced combination of camphor, menthol and methyl salicylate, in a non-greasy, water-soluble base.

Applied over the seat of the pain, K-Y Analgesic exerts a prompt sedative effect, relaxes spasm, decreases surface tension, and these, together with the well-known analgesic effects of its constituents, assure a relief of the local pain that is as pronounced as it is gratifying.

The efficacy and wide range of usefulness of K-Y Analgesic will, therefore, commend it at once to physicians who appreciate the growing importance of local applications. It is convenient, does not blister, can be easily washed off, and is notably cleanly, since it is non-greasy and does not soil or stain the skin or clothing. K-Y Analgesic can be used as freely as may be desired, and this, moreover, with the further advantage that it not only will not interfere in any way with desirable systemic medication, but will, in many instances, tend to aid and increase its efficiency.

K-Y Analgesic fills a definite and important place in the modern armamentarium, and the more it is employed the more the practitioner comes to rely on it as a safe and dependable pain reliever.

K-Y
ANALGESIC
FOR
the relief of Headache, Neuralgia, Rheumatism, Lumbago,
Sore Throat, and other conditions requiring the use of a local

K-Y Analgesic is supplied in handy collapsible tubes. A sample will be sent to any physician on request.

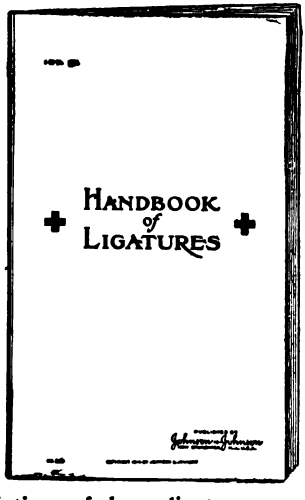
---

Forty thousand civilian medical men were mobilized for service in the World War. In addition seventy-two thousand medical men and women were enrolled in the Volunteer Medical Service Corps.

## Literature for Physicians

Johnson & Johnson publish considerable literature of interest to the busy physician, some of which is listed below. Physicians and nurses are invited to send for such publications as they desire. There is no charge for this service.

HANDBOOK OF LIGATURES, No. 226.—This forty-eight-page book gives a full



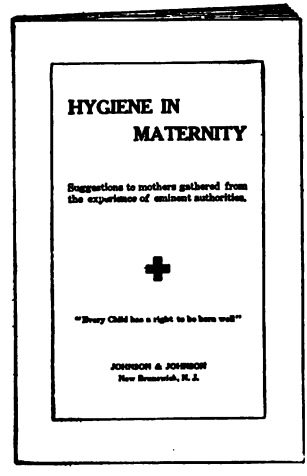

description of how ligatures are prepared, illustrates the various methods of packing, describes the sizes, strength, etc.

COTTON AND GAUZE BOOK.—The reader is carried from the cotton fields to the hospital operating room and made familiar with every phase of the process that transforms the cotton fibre into the pure, clean surgical dressings. Forty pages and sixty illustrations.

BLISTERING TIME TABLE, No. 54.—A twenty-four page illustrated booklet containing concise facts about blistering.

CAMPHENOL BOOKLET, No. 328.—An eight-page booklet describing the medical and surgical uses and the germicidal power of Camphenol.

CHLORAM NE-T GAUZE FOLDER, No. 392.—A four-page folder, descriptive of a new antiseptic dressing, a product of war experience.




HYGIENE IN MATERNITY, No. 41.—A forty-eight-page book which many physicians and nurses like to place in the hands of expectant mothers. It represents the work of several eminent physicians and nurses. Will be supplied for distribution among obstetric patients, if desired.

JOHNSON'S FIRST DRESSING FOR INFANTS, No. 397.—Four-page folder, descriptive of this packet.

FIRST AID CATALOG, No. 110.—Twenty-page pamphlet in colors describing the various First Aid Outfits.

CONTAGIOUS DISEASE BULLETINS.—These bulletins are written from the standpoint of the best authorities upon sanitation and embrace the latest and best known methods used by Health Boards to combat contagious and infectious diseases. The list of Bulletins is as follows:

Diphtheria and Scarlet Fever Bulletin, No. 28.

Typhoid Fever and Allied Diseases Bulletin No. 29.

Infantile Paralysis and Meningitis Bulletin, No. 38.

Whooping Cough and Measles Bulletin, No. 40.

Consumption Bulletin, No. 56.

Smallpox Bulletin, No. 57.

## Pruritus

JULIANA GRAEME IN TRAINED NURSE.

Pruritus is one of those diseases which the sufferer never mentions, and yet it may lead to very serious results. It means itching of the genitals and the anus, which has become so firmly established that the sufferer almost goes insane during the spasm.

The flaccidity of one's muscular system after excessive fag or strain causes a tendency to prolapse in the tissues lining the lower body cavities, and if pruritus has once set in, the presence of hairs add to the intense itchiness most excruciatingly. The spasm lasts from five minutes to twenty, and can be locally relieved by:

(1) Small but repeated swabbing with spirits of camphor. (2) Very hot compresses. (3) Tincture of iodine. (4) Smearing with K-Y. (5) Dilation of parts manually and exposure to air.

Scratching is wrong, but one would have an iron will to avoid it. However, deep-seated ulcers may ensue, or tumors in the surrounding areas, in the form of beads, the size of a grape, for instance, directly under the coccyx, to say nothing of cancer.

Pruritus is supposed to be due to the action of the staphylococcus albus, and where surgical interference is necessary, as is very probable, the rectal cavity will require an enema of some solution safe for that very delicate tissue.

There may be hemorrhoids, fistulæ, tabs below the anus, fissures or parasites as main causes of this condition, the four first requiring the scalpel, the other general systemic as well as local treatment, the sooner the better. Loss of sleep, irritability and fag react on the condition in such a way as to heighten it, as well as reducing the patient's efficiency.

It is any nurse's duty to point the way to a consultation with a physician, whenever she finds pruritus among the not minor evils attendant on the main case she is observing. It requires much tact, but the benefits are great.

This is the way one of our friends across the seas addressed a letter to us. That envelope simply couldn't go wrong.

## Wound Irrigation by Cotton Cords

In treating septic wounds, Canestro (Italian) has modified the Carrell method by substituting strands or ropes of cotton instead of rubber tubes. These cotton strands run from a reservoir filled with antiseptic placed above the patient, then traverse the furrows of the wound and emerge and drain into a lower receptive vessel. If the cords are not long enough to traverse the wound, then a double set may be used, one set from the antiseptic to the wound having an afferent function and the other set having an efferent function from the wound to the drainage vessel.

The author's method is based on his observations that if two vessels be taken, both containing hypochlorite solution with a difference of level between them

of about a meter and then connected with filiform strands, the fluid will pass from the upper to the lower vessel with a velocity equal to about 140 ccm. per hour, the velocity increasing or diminishing according as the distance between the vessels is increased or diminished. Also, if in one vessel a hypochlorite solution is placed, in a second vessel some organic fluid such as purulent hæmatic serum and in a third water, and if the three vessels are put in communication by the cotton strands, it will be seen that the hypochlorite solution passes into the second receptacle, and from thence mixed with the purulent fluid it passes into the third.

He claims that the cotton strands provide a more efficacious drainage than rubber tubes and are less costly.

## Action of Bacteria and Antiseptics on Catgut

Taylor ("Arch. Med. Pharm. Milit.," 69, 1918) reports that catgut ligatures in a wound may disintegrate and secondary hemorrhage follow when the wound contains B. aerogenes capsulatus welchii. No other bacterium appears to attack the catgut, and none of the antiseptics modifies its elasticity or strength, but under the influence of hypochlorite solution the surgical knot becomes untied. Hence he warns against the use of Carrel's solution for a wound in which an important vessel has been ligated, especially in the presence of B. aerogenes capsulatus.—Chemist & Druggist.

## After Effect of Poisonous Gases

Damage done by poisonous gases in war will not end in the fighter's discharge from the hospital. In civil practice doctors may expect delayed effects of war gases for a year or more.

This statement was recently made by Dr. Theodore McGraw, Jr., Lieutenant-Colonel in the U. S. Medical Corps. According to Dr. McGraw, literature on the subject of handling this problem is as yet scanty. The symptoms are for the most subjective. You will find few physical evidences of the damage done, but your patient will complain of shortness of breath, a pounding heart, especially on exertion, and difficulty of breathing at night. Three methods are to be employed in treatment—mental suggestion, graduated exercises and inhalation of oxygen.

The worst after effects were expected from phosgene, although any one of the ten or twelve gases employed by the Germans was serious enough in its immediate action. Men of "nervous temperament" will suffer most from the late symptoms, and the psychological factor is highly important.

"Large doses of hope and encouragement," said Dr. McGraw, "will be your most efficacious remedy. They will get well, and you must tell them so."

## Science in the Drama

A five-act play was recently shown at a vaudeville theatre in Paris, with Pasteur as the hero. The first act represented Pasteur at the opening of the Franco-Prussian war. Pasteur commences his lesson with the text: "Our greatest enemy—the microbe." He next appears before the Academy of Medicine facing hostile critics. Again he is shown receiving the Grand Cross of the Legion of Honor. Other acts show the well-known episode of the lad bitten by a mad dog, and brought in for treatment. Here he creates his first triumph. Later scenes show the scientific hero in the midst of delegates from all over the world, gathered to pay tribute.

The whole drama seems to be founded upon the struggles and the victories of a scientist.

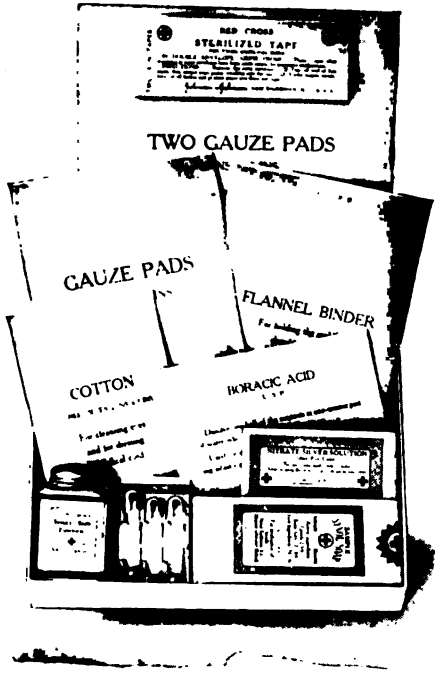
## Gauze Masks Are Effective

Dr. George H. Weaver, in the Journal of Infectious Diseases, concludes that gauze will filter bacterial spray from the air if the thicknesses are in direct proportion to the fineness of the mesh and the number of layers employed. Three layers of gauze with a mesh of forty threads or more will remove almost all bacteria-carrying droplets. Occasional fine droplets pass through.

He, therefore, believes that such masks are useful when worn for protection by attendants on the sick and also when worn by the affected individual to prevent contamination of the surroundings. He emphasizes the fact that the use of masks should not lead to neglect of measures calculated to prevent transfer of infectious material by other means than by droplet spray.

# Red Cross Notes

## Johnson's First Dressing for Infants




The contents of Johnson's First Dressing for Infants, an outfit which meets the recommendations of the National Committee for the Prevention of Blindness.

Johnson's First Dressing for Infants is a complete outfit containing material for cleansing, tying and dressing the umbilical cord, and also material for cleansing the mouth, nose and eyes, including an ampoule of nitrate of silver solution for instillation into the infant's eyes when necessary.

This outfit meets the requirements of the growing number of States which require the use of prophylactic measures in case of babies' sore eyes at the time of birth. It also meets the recommendation of the National Committee for the Prevention of Blindness.

The Johnson's First Dressing Packet contains the following items:

One envelope containing two sterilized tapes for tying the umbilical cord.
Two gauze pads (one with perforation) for dressing the umbilical cord.
One package boracic acid for cleansing and disinfecting the umbilical cord and eyes.
Two small gauze pads for cleansing the eyes, mouth, etc.
Three pieces of sterilized absorbent cotton for cleansing the eyes and dressing the cord, etc.
One ampoule of nitrate of silver solution (one per cent.) for instillation into the infant's eyes when necessary.
One flannel binder for holding the umbilical cord in place.
Three safety pins.
One miniature package of Johnson's Toilet and Baby Powder for use after the infant's first bath.
One miniature bottle of Synol Soap for the bath, cleansing the hands, etc.
One chart for making the birth record.

Full directions accompany each item and a circular in each packet gives instructions to the nurse or midwife.

645

41 C
677